Solid Waste Authority of Broward County

Task 13: Regional Solid Waste and Recycling Master Plan

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GLOSSARY

A

Afforestation: Planting trees to create new forests on previously non-forested land.
Agroforestry: Integrating trees and shrubs into agricultural systems.
Air Quality: The condition of the air based on pollutant levels.
Alternative Energy: Renewable energy sources like wind, solar, and geothermal.
Alternative Fuels: Non-petroleum-based fuels, like biofuels and hydrogen.
Anaerobic Digestion: Breaking down organic waste without oxygen to create biogas.
Aquaponics: A system combining fish farming with plant cultivation.

B

Biodegradable: Substances that can naturally decompose without harming the environment.
Biodiversity: The variety of life in a specific habitat or ecosystem.
Biofuel: Fuel derived from organic materials like plants or animal waste.
Biogas: A renewable gas produced from organic materials decomposing anaerobically.

C

Carbon Capture and Storage: Technology to capture and store CO_2 emissions.
Carbon Footprint: The total greenhouse gases produced directly and indirectly.
Carbon Neutrality: Balancing emitted and removed CO_2 to achieve net-zero emissions.
Carbon Reduction: Decreasing CO_2 emissions to mitigate climate change.
Circular Economy: An economic system focused on reusing, recycling, and reducing waste.
Circular Supply Chain: A supply chain designed to keep resources circulating.
Clean Energy: Energy from sources that release little to no pollutants.
Climate Change: Long-term changes in temperature and weather patterns due to human activities.
Closed-Loop System: A process where waste is reused in production, creating minimal waste.
Compostable: Materials that can break down in composting systems.
Composting: Decomposing organic waste to create nutrient-rich soil.

D

Decarbonization: Reducing carbon emissions across various sectors to combat climate change.
Deforestation: The clearing of trees, often for agriculture or development.
Downcycling: Recycling waste into products of lesser quality.

E

Ecological Footprint: The measure of human demand on Earth's ecosystems.
Ecosystem Services: Benefits humans derive from healthy ecosystems, like pollination.
Ecosystem: A community of interacting organisms and their physical environment.
Emissions: Pollutants released into the atmosphere from various sources.
Environmental Impact: The effect of human activities on the natural world.
Environmental Justice: Fair treatment of all people regarding environmental policies.
E-waste: Discarded electronic devices and components.
Extended Producer Responsibility: Policies holding producers accountable for post-consumer waste.

F

Fair Trade: Trade that ensures ethical treatment of workers and environmental care.
Flaring: Burning off excess gases, often from oil extraction.
Food Miles: The distance food travels from production to consumer.
Fossil Fuels: Nonrenewable energy sources like coal, oil, and natural gas.

G

Geothermal Energy: Renewable energy derived from Earth's internal heat.
Green Building: Construction practices focused on reducing environmental impact.
Green Infrastructure: Natural systems for managing stormwater and improving urban areas.
Greenhouse Gas: Gases that trap heat in the atmosphere, contributing to global warming.
Greenwashing: Misleading claims about the environmental benefits of a product or company.
Greywater: Wastewater from sinks, showers, and laundry that can be reused.

H

Habitat: The natural environment where a species lives.
Heavy Metals: Toxic elements, like lead, that can accumulate in the environment.
Hydropower: Renewable energy generated from flowing water.

I

Industrial Ecology: Studying industrial systems to minimize waste and resource use.
Invasive Species: Non-native species that disrupt local ecosystems.

L

Landfill: A site for waste disposal where trash is buried.
Life Cycle Assessment: Analyzing the environmental impacts of a product from creation to disposal.

M

Marine Debris: Litter, primarily plastic, that pollutes marine environments.
Methane: A potent greenhouse gas often emitted from landfills and agricultural activities.
Microplastics: Small plastic particles that pollute ecosystems.
Monoculture: Cultivating a single crop over a large area, which can harm biodiversity.

N

Natural Capital: The world's stocks of natural resources.
Natural Resources: Materials from Earth, like minerals and forests, used by humans.
Net Zero: Achieving a balance between greenhouse gas emissions and removals.
Nonrenewable Resources: Resources like coal that are finite and cannot be replenished.

O

Ocean Acidification: The reduction in ocean pH due to increased CO_2.
Offsetting: Compensating for emissions by reducing or sequestering carbon elsewhere.
Organic Agriculture: Farming without synthetic chemicals to protect biodiversity.

Organic Waste: Biodegradable waste like food scraps and yard trimmings.
Organics: Biodegradable materials, like food and yard trash.

P

Permaculture: A sustainable land management approach that mimics natural ecosystems.
Photovoltaic Cells: Devices that convert sunlight directly into electricity.
Pollinator: Animals like bees that help plants reproduce.
Pollution: Contaminants introduced into the environment that harm ecosystems.
Population Density: The number of people per unit area, impacting resources.
Post-Consumer Waste: Waste generated after a product has been used by consumers.
Precycling: Making purchasing decisions to avoid waste before it's generated.
Pyrolysis: Thermally decomposing organic material in the absence of oxygen.

R

Reclaimed Water: Treated wastewater used for purposes other than drinking.
Recycling: Reprocessing waste into new products to conserve resources.
Regenerative Agriculture: Farming that aims to restore soil and biodiversity.
Renewable Energy: Energy sources that are naturally replenishing, like wind and solar.
Resilience: The ability of systems to recover from environmental stress.
Resource Efficiency: Using resources wisely to reduce environmental impact.

S

Salinization: The buildup of salts in soil, often from improper irrigation.
Single-Use Plastics: Plastics designed for one-time use, often harmful to the environment.
Smart Grid: An energy network that uses digital technology for efficient distribution.
Soil Health: The ability of soil to support plant and animal productivity.
Solid Waste: Discarded materials from homes, businesses, and industries that require disposal or recycling.
Sustainability: Meeting present needs without compromising the needs of future generations.
Sustainable Agriculture: Farming practices that protect ecosystems.

U

Upcycling: Transforming waste into products of higher quality or value.
Urban Heat Island: Urban areas that are warmer due to human activities.

V

Vermiculture: Using worms to decompose organic waste into compost.
Volatile Organic Compounds: Chemicals that vaporize and harm air quality.

W

Waste Audit: Analyzing the amount and types of waste produced.
Waste Hierarchy: Ranking waste management options by environmental impact.
Waste Minimization: Strategies to reduce the amount of waste produced.
Waste-to-Energy: Converting waste materials into energy.
Water Conservation: Strategies to use water more efficiently.

Wildlife Corridor: A protected path that allows wildlife to move between habitats.
Wind Energy: Energy derived from the movement of wind to generate electricity.

X

Xeriscaping: Landscaping to reduce the need for irrigation.

Y

Yard Trash: vegetative matter from landscaping and yard maintenance.

Z

Zero Waste: An aspirational philosophy where resources are conserved by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health.

ACRONYMS

A

ACC: Air Cooled Condenser
ACOE: Army Corps of Engineers
AD: Anaerobic Digestion
ADC: Alternative Daily Cover
AI: Artificial Intelligence
AMR: Autonomous Mobile Robots
AMV: Average Market Value
APC: Air pollution control
ASL: Automated Side Loader
ASP: Aerated Static Pile
AVL: Automated Vehicle Location
AVR: Automatic Voltage Regulator

B

BACT: Best Available Control Technology
BSE: Bovine Spongiform Encephalopathy
BMSD: Broward Municipal Services District
BW: Bulky Waste

C

CAAA: Clear Air Act Amendments
CASP: Covered Aerated Static Piles
CEMS: Continuous Emissions Monitoring System
CESQG: Conditionally exempt small quantity generator
CCA: Chromated Arsenicals
CCTV: Closed Circuit Television

C&D: Construction and Demolition
CFR: Code of Federal Regulations
CHP: Combined heat and power
CI-ICE: Compression Ignition Internal Combustion Engines
CMMS: Computerized maintenance management systems
CMSW: Commercial Municipal Solid Waste
CNG: Compressed Natural Gas
COSH: Council for Occupational Safety and Health
CPI: Consumer Price Index

D

DAC: Direct air capture
DARM: Division of Air Resource Management
DOE: Department of Energy
DOR: Department of Revenue
DOT: Department of Transportation
DSR: Dual-Stream Recycling

E

EHS: Environmental, health, and safety
EJ: Environmental justice
ENVIROS: Environmental Inquiry and Resource System
EPA: United States Environmental Protection Agency
EPR: Extended Producer Responsibility
EREF: Environmental Research and Education Foundation
EV: Electric vehicles

F

F.A.C.: Florida Administrative Code
FEC: Florida East Coast Railway
FDA: Federal Drug Administration
FDEP: Florida Department of Environmental Protection
FDOT: Florida Department of Transportation
FLM: Federal Land Manager
FOG: Fats, oils, and grease
FoTS: Feet on the Street
F.S.: Florida Statues

G

GHG: Greenhouse gas
GIS: Geographic Information System
GPS: Global Positioning System

H

HAP: Hazardous air pollutants
HHW: Household Hazardous Waste

HMR: Hazardous Materials Regulations

I

ICI: Industrial, Commercial, or Institutional
ICTF: Intermodal Container Transfer Facility
ILA: Interlocal Agreement
IoT: Internet of Things
ITC: Investment Tax Credits

L

LCFS: Low Carbon Fuel Standards
LEED: Leadership in Energy and Environmental Design
LLC: Limited Liability Company
LNG: Liquified natural gas
LQGs: Large Quantity Generators

M

MBT: Mechanical biological treatment
MC/SS: Master Composter/Sustainability Steward
MMBtu: Metric Million British Thermal Unit
MOU: Memorandum of Understanding
MRF: Material Recovery Facility
MSW: Municipal Solid Waste
MW: Megawatts
MWC: Municipal Waste Combustor
MWh: Megawatt hours
MWP: Mixed Waste Processing

N

NAAQS: National Ambient Air Quality Standards
NESHAP: National Emission Standards for Hazardous Air Pollutants
NIMBY: "Not in My Backyard"
NIR: Near-infrared
NGVD: National Geodetic Vertical Datum
NNSR: Nonattainment New Source Review
NPDWR: National Primary Drinking Water Regulation
NRWWTP: North Regional Wastewater Treatment Plant
NSR: New Source Review
NSPS: New Source Performance Standards

O

OCC: Old corrugated containers
O&M: Operations and maintenance
OTM: Other Test Method

P

PAYT: Pay-as-You-Throw
PET: Polyethylene terephthalate
PFAM: Population Forecast and Allocation Model
PFAS: Per- and Polyfluoroalkyl Substances
POTW: Publicly Owned Treatment Works
PPP: Public-Private Partnerships
PPSA: Power Plant Siting Act
PSC: Public Service Commission
PSD: Prevention of Significant Deterioration
PV: Photovoltaic
PVC: Polyvinyl chloride

R

R2: Responsible Recycling
RBAC: Recycling Business Assistance Center
RCRA: Resource Conservation and Recovery Act
RDF: Refuse derived fuel
RED: Resilient Environment Department
REL: Rear-End Loader
RFID: Radio Frequency Identification
RFP: Request for Proposal
RFQ: Request for Quote
RFS: Renewable Fuel Standards
RICE: Reciprocating internal combustion engines
RIN: Renewable Identification Numbers
RMC: Remote Monitoring and Control
RMPF: Recovered Materials Processing Facility
RMSW: Residential Municipal Solid Waste
RNG: Renewable Natural Gas
RRF: Resource Recovery Facility
RSA: Revenue sufficiency analysis
RSM: Recovered screened materials
RSW: Raw shredded green waste
R&T: Recycling and Transfer

S

SCR: Selective catalytic reduction
SEM: Surface Emission Monitoring
SFRTA: South Florida Regional Transportation Authority
SHPA: Swine Health Protection Act
SI-ICE: Spark Ignition Internal Combustion Engines
SQGs: Small Quantity Generators
SS: Single-Stream
SSO: Sanitary Sewer Overflow
SSR: Source-Separated Recyclables
SSR: Single-Stream Recycling
SWA: Solid Waste Authority

SWANA: Solid Waste Association of North America
SWRS: Solid Waste and Recycling Services
SWWG: Solid Waste Working Group

T

TAC: Technical Advisory Committee
TDLAS: Tunable Diode Laser Absorption Spectroscopy
TPD: Tons per Day
TPH: Tons per Hour
TPY: Tons per Year
TRP: The Recycling Partnership

U

UAS: Unmanned aircraft system
UAVs: Unmanned aerial vehicles
UROs: Universal Recycling Ordinances
USDA: United States Department of Agriculture

V

VOC: Volatile organic compounds
VSQGs: Very Small Quantity Generators

W

WARM: Waste Reduction Model
WCF: Waste Connections of Florida
WM: Waste Management
WTE: Waste-to-Energy
WWTP: Wastewater Treatment Plant

Y

YT: Yard Trash

Z

ZBA: Zoning Board of Appeals
ZBB: Zero-Based Budgeting
ZWIA: Zero Waste International Alliance

1.0 EXECUTIVE DIRECTOR'S STATEMENT

1.1 SHAPING BROWARD'S WASTE FUTURE: A UNIFIED PATH TOWARD ZERO WASTE

Broward County stands at a pivotal moment in its environmental and public service evolution. As one of the most populous and diverse counties in the State of Florida, we are both uniquely challenged and uniquely positioned to lead in the transition to a more sustainable, efficient, and equitable solid waste and recycling system. This *Regional Solid Waste and Recycling Master Plan* (Master Plan) is not merely a strategic roadmap—it is a bold declaration of our collective intent to rethink how we value, manage, and ultimately reduce waste across all 31 municipalities, with 28 having already committed, along with Broward County, through our new Interlocal Agreement.

The creation of the Solid Waste and Recyclable Materials Processing Authority of Broward County is a testament to the foresight and leadership of our elected officials and community stakeholders. After more than a decade of fragmentation, the formation of the Authority reestablishes a much-needed regional governance framework—one that allows us to leverage economies of scale, coordinate investments in new infrastructure, harmonize policies, and speak with a unified voice when facing statewide and national policy challenges.

Historically, Broward County has embraced innovation, from early investments in recycling programs to public-private partnerships in disposal and processing. But those successes, while important, are no longer sufficient. Today's waste challenges are far more complex and far-reaching. Climate change, supply chain instability, the rising cost of disposal, community concerns about equity and environmental justice, and an urgent need to reduce greenhouse gas emissions all compel us to act decisively. Landfill space is finite, and reliance on outdated practices can no longer sustain our growing population and economy.

This Master Plan, developed in collaboration with expert consultants, technical advisors, and local stakeholders, reflects a comprehensive, data-driven vision for the next 40 years. It is centered around a singular but transformative and aspirational goal: **Zero Waste to Landfill**. Achieving that goal will require more than new technology or facilities. It requires a cultural shift toward minimizing waste at the source, maximizing beneficial reuse and recycling, and fundamentally rethinking how materials move through our economy — from product design to end-of-life — in order to maximize beneficial reuse while minimizing the amount of waste requiring disposal.

To that end, this Master Plan outlines strategic actions across several key areas:

- **Reducing waste generation** through education, procurement reform, and incentives for circular economy practices.
- **Expanding recovery and recycling** with source-separated organics, construction and demolition (C&D) recovery programs, and mandatory recycling ordinances.
- **Strengthening infrastructure** by optimizing existing assets while identifying new facility needs for transferring, processing, and disposal over the long term.

- **Improving governance and financial sustainability** via flow control mechanisms, assessment models, and regional policy harmonization.

- **Promoting environmental equity** to ensure that historically burdened communities benefit from cleaner operations, improved access to services, and meaningful participation in decision-making.

Public outreach and stakeholder engagement were central to the development of this plan. Community feedback, environmental justice considerations, and an emphasis on multilingual, inclusive education efforts are embedded throughout the recommendations. We recognize that lasting transformation requires trust, transparency, and long-term collaboration across all sectors—government, private industry, non-profits, schools, and residents.

We also acknowledge that technology alone will not solve these challenges. Behavioral change — across households, businesses, and institutions — is essential. The system we envision empowers every resident and visitor to participate meaningfully, supported by consistent messaging, accessible services, and a commitment to continuous improvement.

This Master Plan is a living document. It will be updated regularly to reflect emerging trends, legislative changes, technological advancements, and lessons learned through implementation. But its foundational principles — environmental stewardship, operational excellence, regional cooperation, and public accountability — are enduring.

On behalf of the Solid Waste Authority's Executive Committee, staff, and consultant team, I extend sincere gratitude to the many individuals and organizations who contributed their time, ideas, and passion to this effort. Your input has made this plan stronger, more grounded in community values, and more responsive to the challenges ahead.

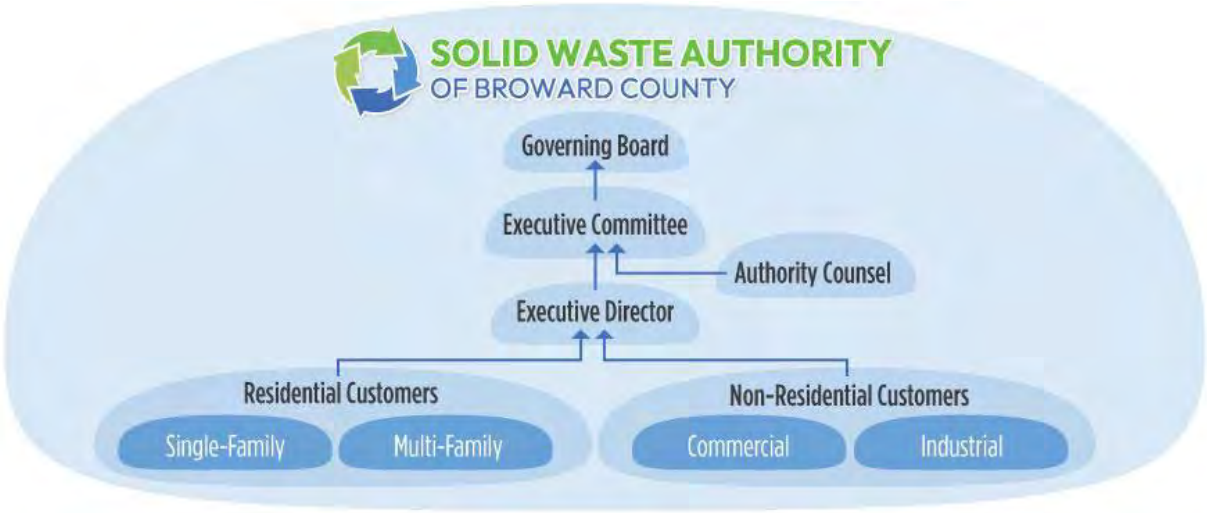
I invite you not only to read this Master Plan but to engage with it. The path to Zero Waste is ambitious, but it is attainable. Together, we can build a solid waste and recycling system that is cleaner, smarter, and more just — for today and for generations to come.

Sincerely,
Todd Storti
Executive Director
Solid Waste and Recyclable Materials Processing Authority of Broward County

2.0 OVERVIEW

The Solid Waste Disposal and Recyclable Materials Processing Authority of Broward County, Florida (Authority) is a newly constituted independent and separate legal entity created pursuant to, and consistent with, Sections 163.01, 403.706(11), (12), (15), and (19), and 403.713, Florida Statutes, through the *Interlocal Agreement for Solid Waste Disposal and Recyclable Materials Processing Authority of Broward County, Florida* (ILA) executed by and among Broward County (County) and numerous municipalities in the County. **Figure 1** presents the organizational structure of the Authority.

Figure 1. Authority Organizational Structure



As prescribed in the ILA (see **Appendix A**), the Governing Board is comprised of an appointed elected official from each ILA Member, and the Executive Committee is comprised of 11 elected officials who also serve on the Governing Board. One (1) member of the Executive Committee represents the County; five (5) members represent the large municipalities; three (3) members represent the medium municipalities; and two (2) members represent the small municipalities. The duties and powers of the Governing Board and Executive Committee are also specified in the ILA.

Consistent with the ILA, the Authority must adopt a Regional Solid Waste and Recycling Master Plan (Master Plan). The Master Plan is a comprehensive strategic document that outlines how the Authority can manage its solid waste from generation to disposal. The purpose of the Master Plan is to provide the Authority with detailed recommendations concerning policies, operations, and facilities needed to create a regional solid waste and recycling system (System) that is environmentally sustainable, transparent, innovative, and economically efficient in its approach to reduction, reuse, recycling, and disposal of the waste generated across the County. It is important to note that the Master Plan is a "living document" that should be revisited and updated periodically to maintain alignment between the Authority and its various stakeholders.

3.0 APPROACH

This Master Plan serves as a strategic framework to guide the development of services, programs, and facilities needed to efficiently and effectively manage the solid waste generated within the County. This Master Plan reflects the analyses and subject-specific White Papers developed by the SCS Engineers Team, which includes Arcadis I.S., Inc., Resource Recycling Systems, and Mercury, since engaged by the Authority in May 2024. Each deliverable is referenced in this Plan and included as an appendix. This Master Plan is intended to be a living document developed in accordance with the Project Framework Summary attached as **Appendix B**. The recommended policies, services, programs, and facilities are envisioned to be carried out via a tactical plan that addresses the preferred procurement and implementation approach. It is anticipated that the Master Plan will be revisited over the planning horizon and adjusted based on the progress made as well as the changes needed to meet the needs of the Authority as they evolve.

The Master Plan was crafted using a Zero Waste lens to develop a clear pathway to meet or exceed the 75% recycling goal established by the State of Florida via House Bill 7135. This involved identifying and evaluating options to maximize the beneficial use of waste stream components while minimizing waste stream components that have no beneficial use. Transparency has been at the forefront of this approach, requiring continuous engagement to provide a local lens through which solutions are evaluated for their suitability, both to the community and to the geographic uniqueness of the Authority and County at large. To facilitate public engagement and enhance transparency, the Authority created a Website (https://browardswa.org/) to support the development of the Master Plan.

3.1 ZERO WASTE LENS

Many communities across the United States[1] recognize that we are a wasteful, "throwaway"[2] society that engages in excess consumption and is quick to discard resources. We miss the societal and economic opportunities offered by the flow of resources and waste, including jobs and valuable materials. Zero Waste principles promote a shift from the current take-make-waste system[3] to a mindset that results in a lifestyle change of minimizing waste generation at the source, encouraging the highest and best use of recirculated materials, and promoting a circular, closed-loop system of production and consumption.

The Zero Waste International Alliance (ZWIA) defines Zero Waste as "the conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health."[4] While Zero Waste is the aspirational goal, solid waste and energy recovery facilities such as waste-to-energy (WTE) facilities and landfills play an important role at the bottom of the hierarchy. Both the United States Environmental Protection Agency (EPA) and

[1] Austin, TX; Baltimore, MD; Hawai'i County, HI; Boston, MA; Boulder, CO; Fort Collins, CO; Chula Vista, CA; Dallas, TX; Delaware County, PA; Los Angeles, CA; Missoula, MT; Montgomery County, MD; Oakland, CA; Oceanside, CA; Palo Alto, CA; San Diego, CA; Washington, DC; King County, WA; Fresno, CA; the State of Connecticut; Middletown, CT; San Francisco, CA; Oakland, CA; Alameda, CA; Pasadena, CA; Ashville, NC; San Jose, CA; Guam; the Commonwealth of the Northern Mariana Islands and many other U.S. and international agencies

[2] RoadtoZeroWasteReport_FINAL.pdf

[3] Circular economy principles: Eliminate waste and pollution

[4] Zero Waste Definition - Zero Waste International Alliance

ZWIA's Waste Management Hierarchies prioritize source reduction, reuse, recycling, and composting above volume reduction via WTE and ultimately landfill disposal, as presented in **Figure 2.**

Figure 2. EPA Waste Management Hierarchy[5]

It is important to note that recycling and beneficial use of waste stream components are not incompatible with WTE; rather, WTE can extract value via metals recovery, energy production, and reducing the volume of waste stream components that are not otherwise beneficially used thereby saving finite landfill capacity.

3.2 MINIMIZE WASTE GENERATION

An important step on the journey to Zero Waste is to start at the source, i.e., minimize waste generation. ZWIA cites three overarching goals necessary to shift from linear resource use to sustainable, circular resource management: producer responsibility, community responsibility, and political responsibility. Producer responsibility related to industrial production and design lies at the front end, community responsibility (i.e., consumption, use, and disposal) lies at the back end, and political responsibility involves bringing the two together[6].

As ZWIA insightfully notes, both individual and collective behaviors must align for a Zero Waste goal to be effective. The Recycling Partnership's 2021 white paper, *Start at the Cart™: Key Concepts of Influencing Recycling Behaviors to Drive a Circular Economy,* asserts that "people are peopley, meaning, our brains and behaviors are both complex and often at odds with each other," and

[5] https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy
[6] Zero Waste Community Principles - Zero Waste International Alliance

concludes that those who are most successful at making and maintaining good choices incorporate those choices into their daily habits and patterns[7]. The lifestyle changes necessary to move closer to a Zero Waste goal involve making conscious choices at every stage, from selecting a product to usage and proper disposal.

Minimizing waste generation is a mission and mindset that an entire community must adopt to be effective; it can only take place over a long period of time and must become self-enforcing. Behaviors for each segment of the population and each institution (e.g., private, public, commercial, industrial, religious) evolve and become aligned through shared values of thriftiness, environmental stewardship, and commitment. Examples of supportive behaviors include:

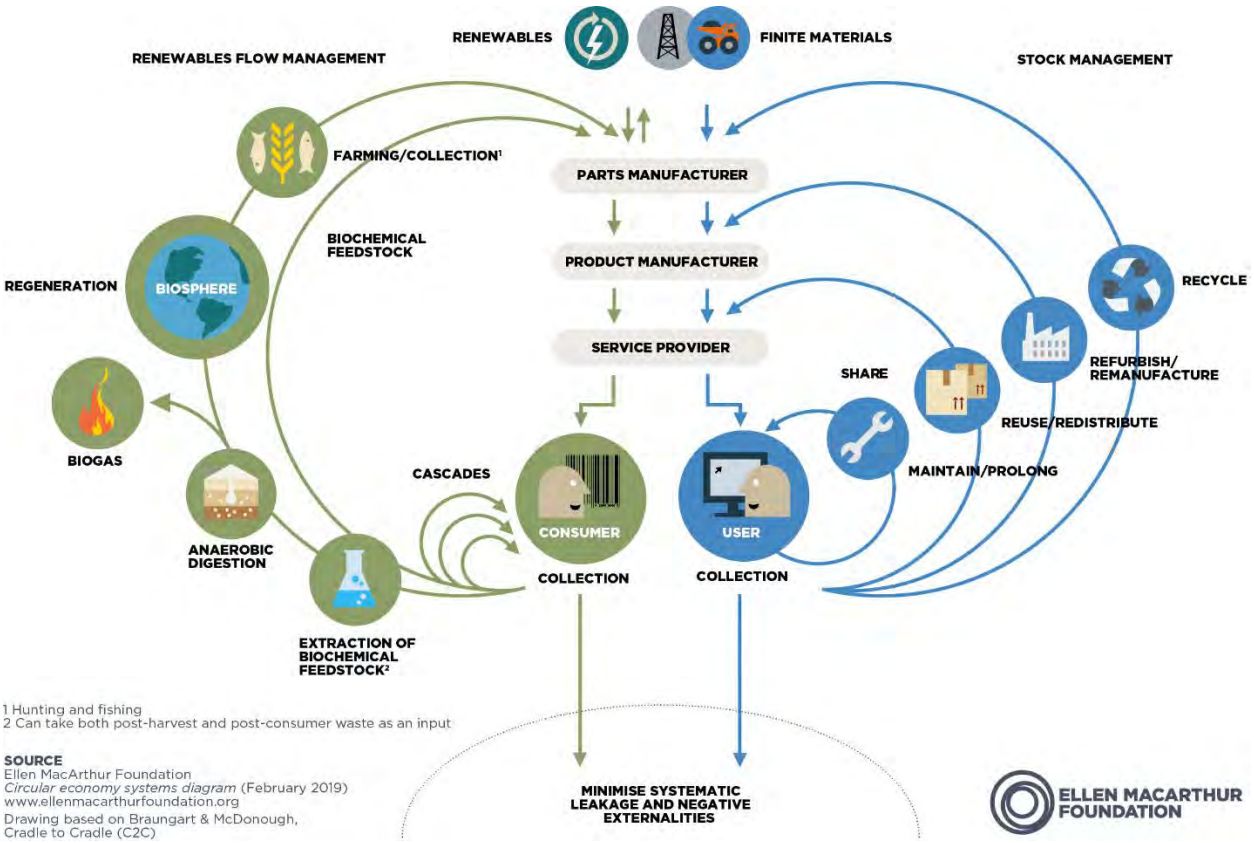
- Setting Zero Waste metrics which are accountable and reviewed regularly, with progress being celebrated
- Reducing consumption of materials
  - Go fully paperless and give preference in procurement processes to digital alternatives
  - Utilize permanent or backhauled reuseable containers (i.e., durable grocery bags)
- Reusing or re-selling materials, items, and tools after initial use
- Repurposing items no longer used for their original intent
- Repairing instead of replacing
- Buying used instead of new materials for the same functions
- Recycling
- Buying recycled content or recycled products; for example, institute procurement policy incentives for recycled content and products vs. virgin content products
- Using bulk instead of packaged products
- Organizing and participating in community swaps (e.g., flea markets, swap meets, waste exchanges)
- Organizing secondary markets for blemished and overstocked food

[7] Influencing-Recycling-Behaviors-Whitepaper-Recycling-Partnership.pdf

3.3 MAXIMIZE THE BENEFICIAL USE OF SOLID WASTE RESOURCES

Maximizing the beneficial use of generated waste is captured in the Ellen MacArthur Foundation's circular economy diagram, commonly known as the butterfly diagram (**Figure 3),** which illustrates two key cycles in the continuous flow of materials in a circular economy: the technical cycle and the biological cycle.

Figure 3. Butterfly Diagram: Visualizing the Circular Economy



Products and materials that are used rather than consumed in the technical cycle (on the right-hand side) are kept in circulation through sharing, reusing, repairing, refurbishing, remanufacturing, and recycling. Inner loops such as sharing, maintaining, and reusing capture the most value as keeping a product whole retains more of its embedded value. Recycling – transforming a product or component into its basic materials – is the final step in the technical cycle. Though the time and energy invested in making a recycled product is lost, the value of the materials is retained as they are recirculated into the economy once more[8].

The biological cycle (on the left-hand side) illustrates the process by which products that are consumed, such as food, can biodegrade and safely return to the earth. Regeneration is at the heart of the biological cycle, shifting the focus from doing less harm to the environment to actively

[8] The *technical* cycle of the butterfly diagram

improving it. Recovering materials embedded in organic waste through anaerobic digestion or composting and using food by-products to make other materials for a variety of applications are ways to beneficially recirculate organic matter through the biological cycle[9].

Key to maximizing the beneficial use of waste stream components is robust public engagement, education, and building trust that includes communicating the "who, what, where, when, and how" of resource stewardship and rational for behavior change. This includes clarifying set-out requirements for solid waste, recyclable materials, yard trash, bulk waste as well as opportunities to manage household hazardous waste, electronics, and other waste stream components that can best be managed upstream from disposal. Starting with these basics creates the conditions to enhance the resource management program in the future. For example, after establishing a yard trash processing facility, expand the services to include other clean organics (e.g., food waste).

[9] The *biological* cycle of the butterfly diagram

4.0 GUIDING PRINCIPLES

An initial step for developing the Master Plan was the establishment of Guiding Principles to serve as the framework to conduct the analysis and ultimately to assure that the resulting recommendations are aligned with the values and priorities of the Authority. Essentially, the Guiding Principles frame the pathway from the current state through the 40-year planning horizon, providing clarity in terms of the Authority's starting point and its direction going forward. The Guiding Principles are presented in no particular order below, with the exception of controlling your solid waste destiny, which was prioritized above all others by the Executive Committee:

- Control Your Solid Waste Management Destiny – developing the services, programs, and facilities such that the Authority takes responsibility for managing the solid waste generated in the County and the outcomes of the decisions.

- Zero Waste Focus – taking a "whole system" approach to services, programs, and facilities to minimize consumption and the associated waste generation and to maximize beneficial reuse and recycling.

- Environmental Compliance – managing the impacts to the air, soil, water, and wildlife as well as "quality of life" impacts to the community such as aesthetics, odor, noise, and traffic.

- Management Compliance – satisfying the applicable growth management requirements for solid waste concurrency.

- Long-term Disposal Solution – achieving a reliable disposal approach over the 40-year planning horizon.

- Commercially-Proven Technologies – technology that has been designed, constructed, and operated/implemented in the United States on a commercial scale (not a pilot plant or research facility) for at least one year in a reliable and consistent manner. The capacity of the technology is appropriate to manage the quantity of material typically produced, and products of the processing have been marketed effectively.

- Operational Excellence – optimizing the operations of the Authority's solid waste management assets as well as the programs that will be administered by the Authority.

- Harmonization of Services County-wide – aligning the services, programs, and facilities to provide unified services across the Authority.

- Best Value Service – developing services, programs, and facilities that reflect local and regional conditions and appropriately balancing the value with the cost and with key policies.

5.0 KEY POLICIES CONSIDERED

Acting in concert with the Guiding Principles, the following Key Policies also provide clarity in terms of the Authority's strategic direction. The key policy considerations embraced by the Executive Committee are presented below in no particular order. Refer to the Key Policy Survey Presentation in **Appendix C** for additional details.

- The Master Plan assumes a 40-year planning horizon and considers the time associated with implementation of the recommended services, programs, and facilities.
- The Authority wants to consider options to dispose of waste outside of the County and is looking for partnerships with other units of government where appropriate.
- The Authority wants to maximize the use of existing infrastructure within Broward County.
- Technologies that are not commercially proven should be excluded from consideration. Technology maturity should be monitored to provide maximum flexibility over the planning horizon.
- Because of geography, natural disasters can have a dramatic impact on facility use, particularly private sites; therefore, the Master Plan need not align with the County's individual Disaster Debris Management Plans.
- The Authority will strive for cost-effective and efficient delivery of solid waste and recycling services and has the ability to enact an annual assessment to provide funding, with rates needing to reflect the cost of services in the local waste market
- The minimum distance from solid waste facilities to residential properties has evolved. Initially, the Executive Committee suggested a minimum distance of one mile from residential properties. However, due to the build-out of the County, this distance was not feasible and was decreased to half a mile, then to a quarter mile for certain facility types. The number of possible sites decreased as privately-owned parcels were eliminated in favor of County and municipally-owned sites.
- In alignment with the Authority's equity and inclusivity goals, environmental justice considerations to apply to the development of the Master Plan generally emphasize equitable outcomes for all communities, particularly those historically affected by environmental challenges.
- The Authority is encouraged to consider mandatory residential and commercial recycling. Initial steps that can be taken immediately include focusing on yard trash, which sets the stage for processing for beneficial use, and commercial C&D debris recycling.

6.0 ESSENTIAL TAKE-AWAYS

Through the development of the White Papers referenced herein, several themes emerged that are essential to the successful implementation of the Master Plan. Each essential theme is discussed further in the following sections.

6.1 BEHAVIOR CHANGE

One way to create behavior change is by developing a robust communications infrastructure based on **access**, **knowledge**, and **engagement.** This is key to changing the paradigm from a culture of consumption to a culture of minimizing waste and maximizing the beneficial use of waste stream components to reduce the amount of waste requiring disposal.

Access refers to whether recycling bins are readily available or if residents must walk or drive to drop off centers. Access is critical to the success of any recycling or zero waste program. It ensures that each resident, employee, or visitor can conveniently recycle or reuse end-of-life materials as easily as throwing them away. It is vital that everyone, regardless of ethnicity, primary language, or socioeconomic status have the same access to these programs and that the instructions they receive to participate in the programs are in their language of choice.

Knowledge refers to conveying the information people need to make decisions about what, when, and how to recycle. As part of developing our understanding of residential waste generator perceptions, a recycling survey was developed and deployed in early 2025. The survey considered property type, property ownership, income, and age. Key findings were:

- 86% of the respondents have separate solid waste and recycling carts
- 87% of the respondents receive recycling information from their municipality or County
- 43% of the respondents prefer receiving recycling information via email
- 43% of respondents trust that recyclable items that are placed in recycling carts get recycled
- 94% of respondents indicated that they recycle according to guidelines
- 59% place yard trash at the curb for collection

A summary presentation from the residential survey is included in **Appendix D**.

Engagement involves an individual's values, beliefs, attitudes, and identity, as well as the social dynamics and norms within their household, workplace, and community. It is not enough just to "tell" residents or businesses what they need to know. A fully optimized recycling collection and processing system cannot reach its full potential without effective education, outreach, and community engagement. Further, a trusted messenger is vital to a successful behavior change campaign.

A key component of the knowledge phase is determining the key motivations of the target audiences. Then, during the engagement phase, prompts for behavior change can be created based on those motivations. Using the last Census as a guide for Broward County, it is likely that the focus audiences for the research phase should be English, Spanish, and Haitian Creole speakers between the ages of 18 and 40 and 65 and over, both single-family home residents (rent and own) and multifamily home residents (rent and own) with a high school education and above. During the research phase, barriers to behavior change (recycling and recycling the right items) can be determined and then addressed during the education and engagement phases. To determine similar factors from

businesses and institutions, a key tactic would include creating an electronic survey and sending a postcard describing the goals with a link to the survey. Some sort of motivation, such as a drawing for a gift card, often is needed to encourage businesses to complete the survey. In addition, providing businesses and institutions with the information they need to comply with local ordinances and regulations is a crucial step. The County can thus influence businesses and institutions to change behaviors, and then key players within those locations will influence their employees in a domino effect of information and influence.

An initial interactive Public Workshop was convened in September 2024 to introduce the Master Plan and solicit feedback from a range of stakeholders, including elected officials, staff, and public stakeholders. One of the themes of the Workshop was that "there is no 'away' for garbage"— a reminder that all waste has consequences, and how we manage it affects the environment and the health of our communities. Key takeaways from the Broward County Solid Waste Management Public Workshop are presented in **Appendix E**.

6.2 ECONOMIES OF SCALE

A driving force for establishing the Authority was the notion that the benefits of working together exceed those of operating independently. For context, the decision not to extend the original Resource Recovery System in 2013 was based in part on the belief that the "free market" would enable competition and that each of the former member communities would benefit in terms of cost and service. While some benefits were realized in the short-term, the desired benefits have not been sustained over the longer term.

In order to fully realize the opportunities presented by the establishment of the Authority, it is critically important to leverage economies of scale to manage the collective waste stream. This is best accomplished via a concept known as flow control, which is the ability to direct where solid waste and recyclables generated within a jurisdiction must be transported, processed, or disposed. The primary objectives of flow control include:

- Ensuring adequate and reliable waste volume to support public or designated private facilities (e.g., landfills, waste-to-energy plants, material recovery facilities).
- Maintaining environmental standards, such as higher recycling or diversion rates.
- Providing fiscal stability for solid waste infrastructure which often relies on minimum tonnage or stable tipping fees.

Flow control can be established through three primary mechanisms: regulatory (i.e., ordinance), contractual, and economic. While each mechanism has unique legal, operational, and financial implications, the recommended approach entails the following:

- A hybrid approach that combines both ordinance-based and contractual flow control to leverage the strengths of each. For instance, a County ordinance could outline a broad requirement to use designated facilities, while interlocal agreements define specific terms for each municipality, including put-or-pay clauses or cost-sharing formulas.

- Allow for phased implementation to enable the alignment of new ordinances or interlocal agreements with existing contract expirations in order to reduce disruption to municipal budgets and operations.

- Provide economic incentives, such as favorable tipping fees or rebates, to encourage early adopters and mitigate the political or economic challenges of mandated flow control as well as performance-based incentives for municipalities or haulers that meet or exceed recycling/diversion targets.

- Adopt clear enforcement mechanisms and utilize staff to oversee inspections, tonnage tracking, and penalty enforcement.

- Standardize data reporting requirements for all municipalities and private haulers to ensure transparency.

6.3 LEVERAGE EXISTING INFRASTRUCTURE

As detailed in the Task 2 White Paper, there is currently adequate infrastructure within the County to meet current solid waste management needs. It is important to note that the analysis presented in the Task 4 White Paper identified the need for a wide range of new facilities over the planning horizon. However, this conclusion was based largely on an "academic approach" to identifying the infrastructure needed to reach the target recycling goal given the increased volume of waste to be managed by 2045. In the short-term, it is recommended that the Authority leverage the existing infrastructure while targeting waste streams that can be beneficially used immediately (e.g., traditional recyclable materials, yard trash, C&D debris). This approach, along with a focus on robust public engagement and education to maximize waste minimization and "recycling right" are expected to result in a higher recycling rate in the short-term, while further infrastructure needs are evaluated.

6.4 HARMONIZATION OF SERVICES

Harmonizing services is defined as building service consistency across the ILA communities in terms of how solid waste and recyclable materials are collected (i.e., set out at the curb), where materials are processed, and how information is developed and disseminated. It is critically important that education, outreach, and messaging are carefully coordinated to ensure consistency across the Authority.

7.0 HISTORY/BACKGROUND

In the 1980s, a partnership known as the Resource Recovery System was formed among the County, most municipalities within the County, and the private sector. The purpose of this partnership, which was bound by an Interlocal Agreement (ILA), was to develop a state-of-the-art solid waste management system, and the result was, indeed, a cost-effective, sustainable, and environmentally safe solid waste management system. As the ILA expiration date drew near, the County convened a Solid Waste Visioning Summit in 2006, also known as the Trash Summit, during which County stakeholders developed a policy framework to manage uncertainty; they also began considering the best solution based on value and cost, governance and implementation, flexibility, control and environmental stewardship. However, the ILA Cities and the County allowed the ILA to expire in 2013, granting each former member autonomy in solid waste management

Following the expiration of the ILA, concerns arose surrounding the formation of solid waste monopolies. This led the County and several cities to reopen the dialogue, develop a new vision for the future of solid waste management across Broward County, and identify a means to achieve that vision.

Ultimately, these events led to the formation of a Solid Waste Working Group and the commissioning of studies by both Arcadis and SCS Engineers that would serve to detail how a 75% County-wide recycling goal may be reached, and other solid waste disposal issues identified by the Solid Waste Working Group. An ILA creating the Solid Waste and Recyclable Materials Processing Authority of Broward County was executed thereafter in 2023. The preparation of this Master Plan resulted from the Authority's Request for Proposal for Consulting Services.

8.0 EXISTING SOLID WASTE SYSTEM

There are existing public, municipal, and private solid waste processing and disposal facilities located throughout Broward County. The subsections below provide an overview of ILA and non-ILA Members and an overview of the existing solid waste infrastructure.

8.1 ILA MEMBERS

Of the 31 municipalities in Broward County, 28 municipalities and the County executed the ILA and agreed to participate in the Authority. **Figure 4** is a map of the ILA and non-ILA Members.

Figure 4. County Map of ILA and Non-ILA Members

8.2 EXISTING FACILITIES

There are several County-owned, municipal-owned, and privately-owned solid waste processing and disposal facilities located within Broward County. The general location of each facility is noted in **Figure 5**, and **Table 1** lists each facility name, ownership, and waste stream materials accepted for processing and/or disposal.

Figure 5. Existing Solid Waste Management Facilities in Broward County

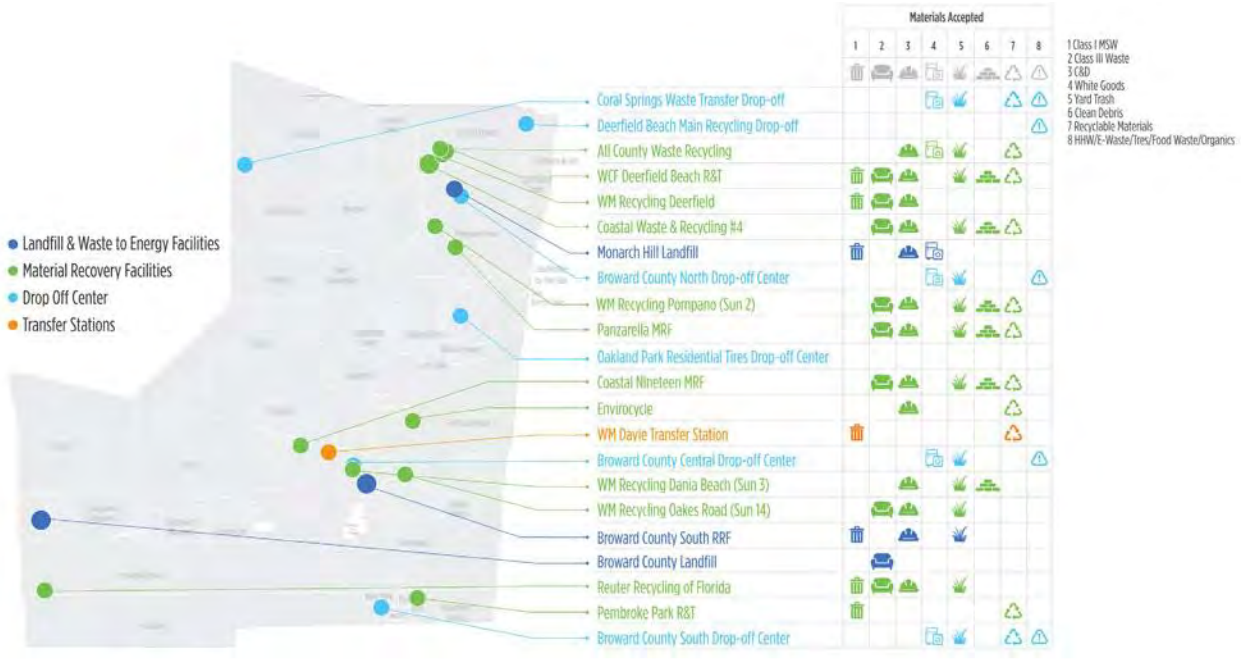


Table 1. Municipal, County, and Privately Owned and Operated Solid Waste Facilities in Broward County

Facility Type	Facility Name	Owner/Operator	Location	Materials Accepted
Landfill	Broward County Landfill	Broward County	7101 SW 205th Avenue Southwest Ranches, FL 33332	Class III
Landfill	Monarch Hill Landfill	WM	2700 Wiles Road Pompano Beach, FL 33073	MSW; C&D; White Goods
WTE	Broward County South RRF	WIN Waste Innovations	4400 South State Road 7 Fort Lauderdale, FL 33314	MSW; Yard Trash; C&D

Facility Type	Facility Name	Owner/Operator	Location	Materials Accepted
SS RMPF	Reuter Recycling of Florida (aka WM Pembroke Pines Single Stream)	WM	20701 Pembroke Road Pembroke Pines, FL 33029	Class I; Class III; C&D; Yard Trash; Recyclables
SS RMPF	Pembroke Park R&T	Waste Connections of Florida	1899 SW 31st Avenue Pembroke Park, FL 33009	Class I; Recyclables
C&D RMPF	WM Recycling Oakes Road (Sun 14)	WM	3250 SW 50th Avenue Davie, FL 33314	C&D; Class III; Yard Trash
C&D RMPF	All County Waste Recycling	All County Waste Recycling Inc	1810 SW 42nd Way Deerfield Beach, FL 33442	C&D; Yard Trash; White Goods; Recovered Materials
C&D RMPF and RMPF	WCF Deerfield Beach R&T	Waste Connections of Florida	1751 SW 43rd Terrace Deerfield Beach, FL 33442	Class I; Class III; C&D; Yard Trash; Clean Debris; Recovered Materials
C&D RMPF and RMPF	WM Recycling Deerfield	WM	1750 SW 43rd Terrace Deerfield Beach, FL 33442	Class I; Class III; C&D
C&D RMPF and RMPF	Coastal Nineteen MRF	Coastal Waste & Recycling of Florida	7061 SW 22nd Court Davie, FL 33317	C&D; Yard Trash; Class III; Clean Debris; Recovered Materials
C&D RMPF and RMPF	Panzarella MRF	Panzarella MRF LLC	1601 SW 3rd Street Pompano Beach, FL 33069	C&D; Yard Trash; Class III; Clean Debris; Recovered Materials
C&D RMPF and RMPF	Coastal Waste & Recycling #4	Coastal Waste & Recycling of Florida	1840 NW 33rd Street Pompano Beach, FL 33064	C&D; Yard Trash; Class III; Clean Debris; Recovered Materials
C&D RMPF and RMPF	Envirocycle	Envirocycle, Inc.	849 SW 21st Terrace Fort Lauderdale, FL 33312	C&D; Recovered Materials

Facility Type	Facility Name	Owner/Operator	Location	Materials Accepted
C&D RMPF and RMPF	WM Recycling Pompano (Sun 2)	WM	2281 NW 16th Street Pompano Beach, FL 33069	C&D; Yard Trash; Class III; Clean Debris; Recovered Materials
C&D RMPF and RMPF	WM Recycling Dania Beach (Sun 3)	WM	3251 SW 26th Terrace Fort Lauderdale, FL 33312	C&D; Yard Trash; Clean Debris
Transfer Station	WM Davie Transfer Station	WM	2380 College Avenue Davie, FL 33317	Class I; Recovered Materials
Recycling Drop-Off Center	Broward County North Drop-Off Center	Broward County	2780 N Powerline Road Pompano Beach, FL 33073	Yard Trash; White Goods ; HHW; E-Waste; Tires
Recycling Drop-Off Center	Broward County Central Drop-Off Center	Broward County	5490 Reese Road Davie, FL 33314	Yard Trash; White Goods; HHW; E-Waste; Tires
Recycling Drop-Off Center	Broward County South Drop-Off Center	Broward County	5601 W Hallandale Beach Boulevard Pembroke Park, FL 33023	Yard Trash; White Goods ; HHW; E-Waste; Tires
Recycling Drop-Off Center	Deerfield Beach Main Recycling Drop-Off	City of Deerfield Beach	401 SW 4th Street Deerfield Beach, FL 33441	Recyclables; Food Waste; Certain HHW Materials
Recycling Drop-Off Center	Coral Springs Waste Transfer Drop-Off	City of Coral Springs	12600 Wiles Road Coral Springs, FL 33076	Organics for Composting; White Goods; Recyclables; Yard Trash
Recycling Drop-Off Center	City of Plantation Recycling Drop-Off Center	City of Plantation	750 NW 91st Avenue Plantation, FL33324	Yard Trash

8.3 DATA SOURCES

Existing studies and other sources of information that served as reference material in the development of this Master Plan are detailed in the Task 2 White Paper, which is presented in **Appendix F.**

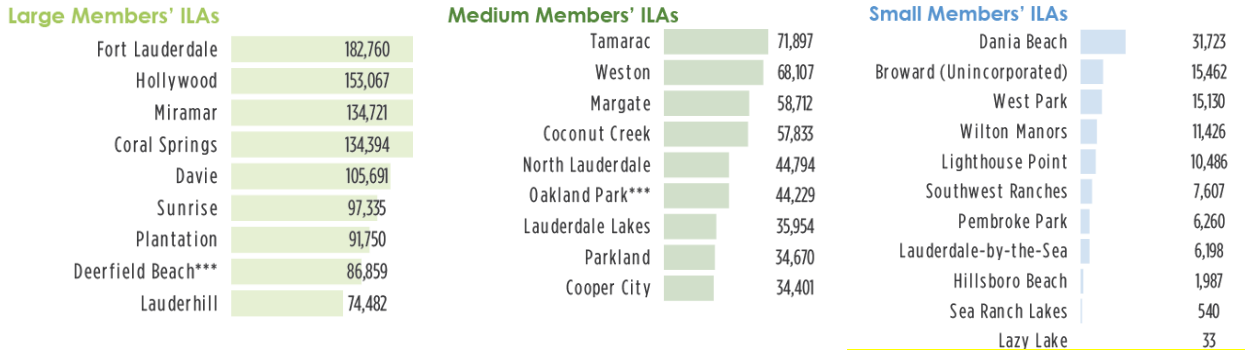
8.4 POPULATION, WASTE GENERATION, AND WASTE COMPOSITION PROJECTIONS AND ESTIMATES

As a starting point, the SCS Team used population and waste composition data to project waste generation by material type over the planning horizon along with the specific attributes of each ILA Member to develop the baseline conditions for this Master Plan; each element is summarized below.

8.4.1 Population

The generation of solid waste in a given community is determined primarily by its population. Therefore, population and growth rate projections were estimated for each ILA Member community by utilizing the most recent US Census year, 2020, referred to as the "Calibration Year". The population projections and growth rates after 2020 are based on the 2023 Broward County and Municipal Population Forecast and Allocation Model (PFAM)[10], published by the Broward County Planning and Development Management Division. Growth rates were then adjusted for each ILA Member for each year of the model from 2020 to 2045 to match (as closely as possible) the population values published in the 2023 PFAM. **Figure 6** presents the population of each ILA Member.

Figure 6. ILA Member Population



8.4.2 Waste Generation

The waste generation estimate over the planning period is based on County data provided in the Florida Department of Environmental Protection (FDEP) reports titled *2020 MSW Collected and Recycled by Generator Type By Descending Population*[11] and *2020 Total Tons of MSW Materials Collected and Recycled In Florida By Descending Population*[12]. This data includes total population (as reported by the US Census Bureau) and the total tons of single-family, multi-family, and commercial MSW collected. Waste generation closely correlates with population, and the waste generation rate for a given municipality is commonly reported in tons per capita, per year. The calculated per capita generation rate is used to estimate the total waste generated per year. The generation rate is projected using a trendline of the past five years of per capita growth, with three

[10] Broward County and Municipal Population Forecast and Allocation Model (PFAM) 2017
[11] 2020 MSW Collected and Recycled by Generator Type
[12] 2020 Municipal Solid Waste Collected & Recycled

options: 1) Low, which is the trendline rate of less 0.75%; 2) Medium, which is a continuation of the trendline rate; and 3) High, which is the trendline rate of +0.75%. The Medium per capita growth rate was used for the initial mass balance model calculations.

The waste generation rate is different for single-family residents, multi-family residents, and commercial employees and customers, so a further refinement of the population estimates for those waste fractions was needed. For this purpose, the ILA Member data in the model includes an estimate of single family and multifamily housing units in 2020 taken from the Broward County Affordable Housing Needs Assessment[13]. From this data, both the number of single- and multi-family housing units and the average number of residents per unit can be estimated, allowing for an estimate of the population of single-family and multi-family residents. Combining these refined population estimates with the FDEP MSW tonnage data, the per capita waste generation rate ratio for each housing unit type was calculated for 2020, which is the portion of the County-wide per-capita generation rate represented by residents of each housing type.

This ratio was then multiplied by the total per capita generation rate to derive the direct waste generation rate, which was recalculated as the model year (and County-wide waste generation rate) changes. The commercial waste generation rate ratio was similarly calculated from the commercial tons reported in the FDEP report titled *2020 MSW Collected and Recycled By Generator Type*[14] less the C&D tonnage reported in the FDEP report titled *2020 Total Tons of MSW Materials Collected and Recycled In Florida*[15], divided by the 2020 population estimate for Broward County from the US Census Bureau. This ratio was then multiplied by the total per capita generation rate to derive the direct waste generation rate, which was recalculated as the model year (and County-wide waste generation rate) changes. The following sections provide additional insights into the waste stream components and their application to the Master Plan.

8.4.3 Waste Composition

To estimate the waste composition for each ILA Member, the model uses the four waste fractions presented in the *Broward County 2023 Waste Characterization Study Final Report*[16], which are defined as follows:

- Source-Separated Recyclables (SSR) – this includes clean recyclables collected from curbside residential collection and multi-family and commercial recycling containers.
- Residential MSW (RMSW) – MSW from single-family residences.
- Commercial MSW (CMSW) – MSW from multifamily and commercial properties.
- Construction and Demolition Waste and White Goods (C&D/BW) – includes wastes from the construction and demolition of structures (e.g., roofing shingles, wood, concrete, drywall), as well as White Goods (e.g., furniture, mattresses).

During a waste characterization study performed as part of a separate engagement with Broward County, SCS Engineers conducted sampling and determined the materials composition of each of

[13] Broward County Affordable Housing Needs Assessment, September 2022
[14] 2020 MSW Collected and Recycled by Generator Type
[15] 2020 Municipal Solid Waste Collected & Recycled
[16] Microsoft Word - Broward County Waste Composition Study Final Report_V6

these four waste fractions. The percentages of each waste fraction were then calculated for each ILA Member, as follows:

- **SSR** - The SSR percentage depends on access to and participation in recycling. Access is determined by the availability of residential curbside recycling service and requirements for commercial recycling (which includes multi-family residential housing). Participation is estimated using an assumed set-out rate for single-family residential, multi-family residential, and commercial properties. From this data, the recycling tons for single-family residential, multi-family residential, and commercial properties were calculated, then divided by the total tons for the ILA Member municipality to result in the waste fraction percentage.

- **RMSW** – The RMSW percentage was calculated by multiplying the total single-family population by the single-family generation rate to get the residential MSW tons generated, deducting the recycling (SSR) tonnage, and then divided by the total tons for the ILA Member municipality to result in the waste fraction percentage.

- **CMSW** – The CMSW percentage was calculated by adding the multi-family MSW tons generated (product of the total multi-family population and the multi-family generation rate) and the commercial MSW tons generated (product of the total population and the commercial generation rate), then deducted the calculated recycling (SSR) tonnage for multi-family and commercial. The result was then divided by the total tons for the ILA Member municipality to derive the waste fraction percentage.

- **C&D/BW** – The C&D/BW percentage is simply the remaining waste fraction, calculated as 100% minus the sum of the three waste fractions calculated above.

The total tons calculated for each ILA Member municipality were then multiplied by the calculated waste fractions above, resulting in the total tonnage for each waste fraction. Those tons were then multiplied by the material composition percentages to derive the total tons of each material type in each waste fraction.

8.5 SOLID WASTE MASS BALANCE MODEL

To understand the solid waste processing and disposal needs of the Authority, a Solid Waste Mass Balance Model (Model) was developed based on the population and waste generation projections and the waste composition estimates described above. **Figures 7 and 8** present the estimated current tonnage of waste generated by municipality and current estimated waste flows, and **Figures 9 and 10** present projected waste generation by municipality and estimated waste flows in 2065. The Model estimated the tonnage of solid waste and recyclable materials generated within the County for ILA and non-ILA members, and passing through existing public, municipal, and private solid waste infrastructure in the County as well as out-of-County solid waste infrastructure. The estimates encompass four (4) key phases: Generation, Collection, Transfer/Routing, and Diversion/Disposal. After verifying the mass balance, the model advances year by year, incorporating growth rates and other factors to predict when receiving facilities will reach capacity and require expansion, or when re-routing of waste to alternative sites will be required.

Figure 7. Broward County Estimated Waste Generation by Municipality (2025)

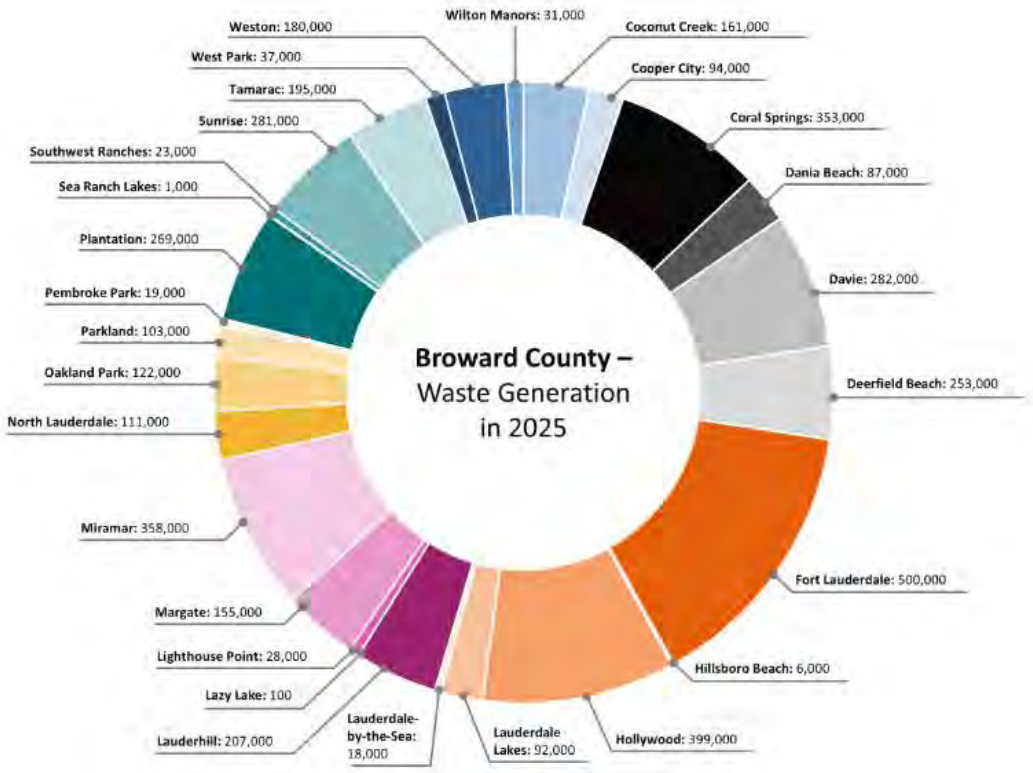


Figure 8. Broward County 2025 Estimated Tonnage of Waste Flows

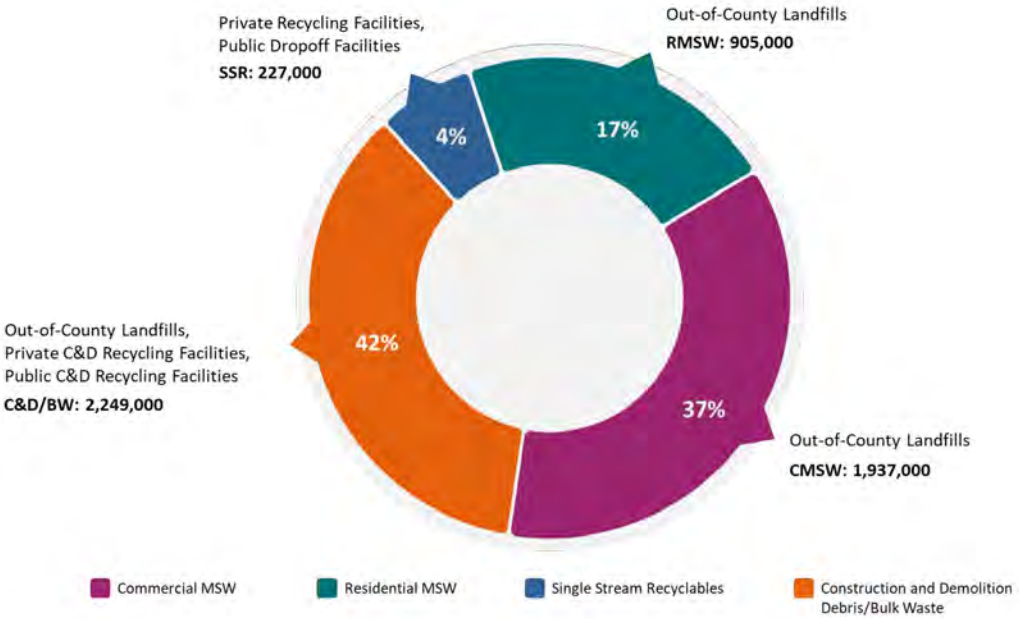


Figure 9. Broward County Estimated Waste Generation by Municipality (2065)

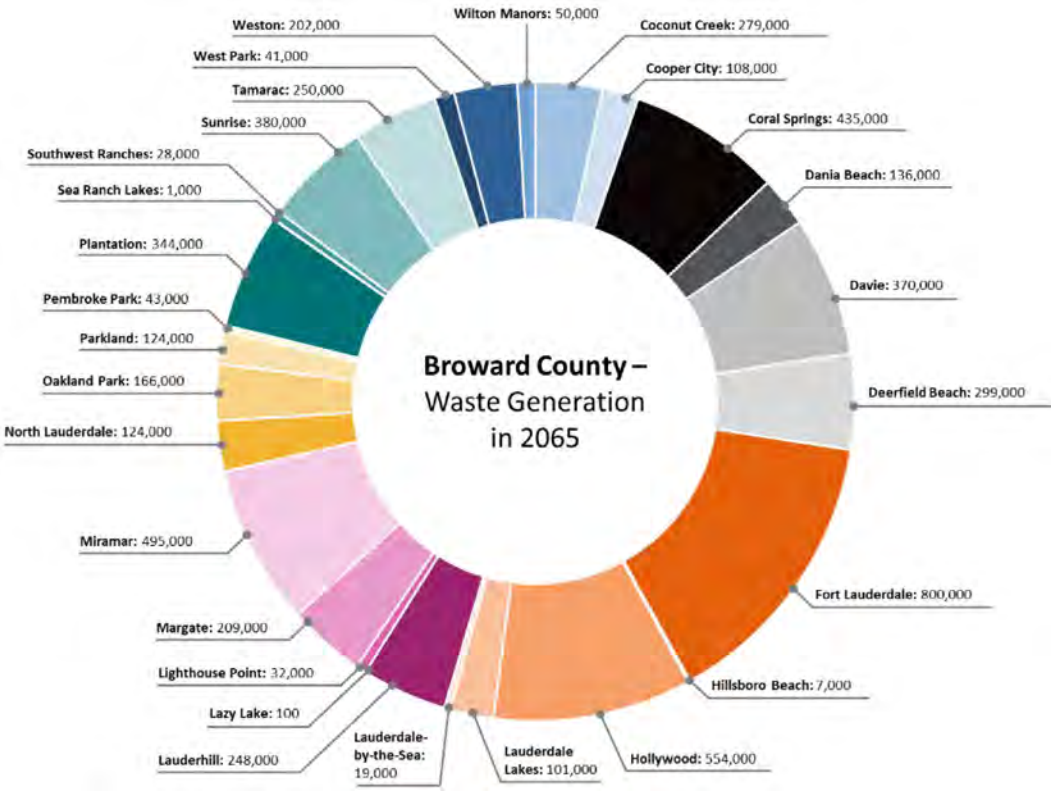
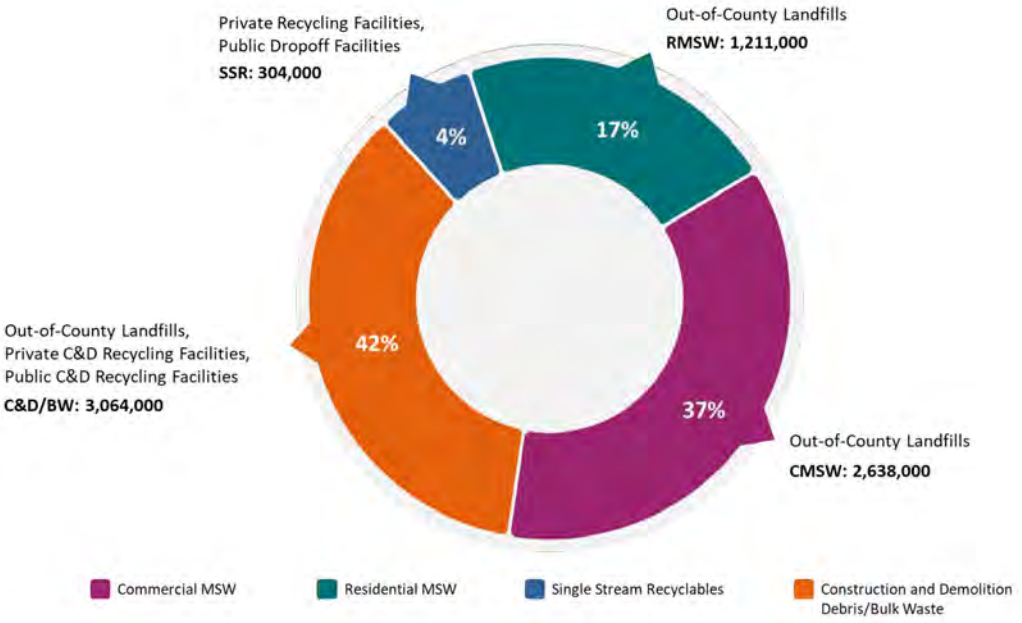


Figure 10. Broward County Estimated Waste Flows, 40-year Planning Horizon (Tons in 2065)



9.0 REGULATORY AND POLICY FRAMEWORK

The SCS Team reviewed applicable ordinances, statutes, rules, regulations, and goals at the Federal, state, and local levels related to solid waste management and recycling and prepared the Task 5 White Paper, which is presented in **Appendix G**.

One of the key challenges facing local government is *preemption*, which restricts local governments from enacting certain laws that would otherwise be allowed under Home Rule[17]. For example, Chapter 403.7033 F.A.C., restricts local governments from regulating auxiliary containers and disposable plastic bags and wrappings. However, it is important to note that government property and government sponsored events are excluded from this preemption law. Some local governments have banned some single-use plastics on their property and at their events. For example, in 2022 Broward County banned Styrofoam on government property and at County sponsored events. This creates an opportunity for local government to lead by example. In addition, a variety of legislative and programmatic options were identified during the development of this Master Plan and are presented as options to advance Zero Waste initiatives are summarized below in **Table 2**.

Table 2. Legislation and Programs Addressing Zero Waste Goals

Legislation or Program	Details	Additional Notes or Examples
Material Bans	Typical items targeted include single-use plastics, plastic straws, polystyrene foam, and plastic bags. Material Bans are impactful in reducing non-recyclable or non-compostable material from the waste stream.	Florida State Law currently prohibits local municipalities from banning certain materials, such as plastic bags, polystyrene foam, etc. Consider intensive and coordinated lobbying efforts at the State level aimed at revising the rules regarding solid waste management-related preemption.
Disposal Bans	Managed at the state level primarily, typical items targeted include cardboard, tires, electronic waste, wood and yard trash, household hazardous waste, and paints. These bans attempt to increase diversion by prohibiting disposal of items with high recycling value or which may have more sensitive environmental impacts.	Florida formerly mandated the processing of wood and yard trash materials, but this mandate was overturned in 2010.
Diversion or Zero Waste Mandates	These mandates are most easily applied to lower tier government bodies as they can be held accountable for reaching proposed goal(s) and can justify spending on the means to reach those goal(s).	

[17] http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&URL=0100-0199/0163/Sections/0163.410.html

Legislation or Program	Details	Additional Notes or Examples
Extended Producer Responsibility (EPR)	EPR policies put financial responsibility for a product's end-of-life on the producers rather than the ratepayers or taxpayers. Despite the complexities of designing the regulations and setting rates, these can be impactful by incentivizing manufacturers and product users.	A deposit return system (i.e., bottle bill) for beverage containers is an example of EPR, where product manufacturers must pay a system fee for the recycling of certain containers. EPR is best accomplished at the Federal or state level.
Public-Private Partnerships (PPP)	PPPs can be an impactful way to develop the infrastructure necessary to improve beneficial use of waste stream components.	
Contractor Performance Incentives	Contracts with operators can be designed so that financial incentives exist for better performance.	San Jose, California's contracts with waste haulers allow for tiered higher rates to be paid to the hauler for higher diversion rates as well as incentives to minimize contamination.
Pay-as-You-Throw (PAYT)	PAYT is a type of incentive structure that encourages waste generators to limit the amount of waste they set out.	The City of Plantation employs PAYT.
Product Certification	A concept being explored by some municipalities is adhering to a certification standard for products created by recycling or organics processors.	Examples include PAS 100, a standard used in the UK for compost, and a standard for biogas to be used as RNG in pipelines.
Government Purchasing Programs	Local governments can enact policies and legislation related to procurement practices to assist in the development of secondary markets for certain recycled materials.	If executed properly, these programs can create the demand for recycled materials, one of the most difficult recycling challenges to overcome.

10.0 FINANCIAL FRAMEWORK

The ILA was designed to streamline and enhance waste management and recycling services by fostering regional collaboration among the County and its municipalities. By unifying waste and recycling management services, the ILA enables the Authority to enhance its negotiating power to secure better contracts and terms, ultimately benefiting the municipalities economically through a more efficient, cost-effective, and sustainable waste management system. The primary goals are to reduce costs for the ILA Members through economies of scale and more efficient operations, leading to more predictable and stable waste management expenses. The ILA contemplates significant investments, either through facility development and ownership or service agreements, to achieve higher recycling rates and lower long-term disposal costs. Additionally, the Authority established by the ILA has the authority to impose special assessments to finance its operations and capital improvements, contributing to economic stability. It should be noted that Section 7.1.1. of the ILA (see **Appendix A**) specifies certain financial requirements related to infrastructure owned by the Authority. As the Authority does not currently own any assets, nor has it secured flow control, it is not possible at this time to detail a complete financial program. However, as a subsequent activity, a more detailed financial management framework will be developed and refined as the recommended elements of the Master Plan are implemented.

10.1 FLOW CONTROL OPTIONS

Flow control enables local governments to direct where solid waste and recyclables generated within their jurisdiction must be transported, processed, or disposed. The benefits of flow control include:

- Ensuring adequate and reliable waste volume to support public or designated private facilities (e.g., material recovery facilities, C&D processing facilities, WTE, landfills).
- Maintaining environmental standards, such as higher recycling or diversion rates.
- Providing fiscal stability for solid waste infrastructure, which often relies on minimum tonnage or stable tipping fees.

There are three primary mechanisms for flow control: regulatory, contractual, and economic. Regulatory flow control is accomplished by enacting an ordinance requiring that waste and recyclables generated within a jurisdiction be delivered to specified facilities. Contractual flow control is established through an interlocal agreement or franchise agreement that directs waste streams to a designated facility or facilities. Economic flow control influences waste generator behavior or collection service providers through tipping fees, rebates, or other financial instruments. Based on the analysis conducted during the development of this Master Plan, a hybrid approach is recommended to address the nuances between the residential and commercial sectors, whereby a County ordinance could outline a broad requirement to use designated facilities, while interlocal agreements or other legal mechanisms in a form determined by the Authority would define specific terms for each municipality, including put-or-pay clauses or cost-sharing formulas. The implementation could be phased in to align new ordinances or ILAs with existing contract expirations, reducing disruption to municipal budgets and operations.

10.2 BUDGETING APPROACH

Government budgeting is the process by which public authorities allocate financial resources to meet societal needs, execute policies, and achieve economic objectives. The primary purpose of government budgeting is to allocate resources efficiently to address public needs while maintaining fiscal responsibility. It involves forecasting revenues, estimating expenditures, and aligning spending priorities to deliver public services efficiently and equitably. The budget serves as a key policy document, reflecting a government's fiscal strategy and priorities for a specific period, usually a fiscal year.

The government budgeting process is typically organized into several key steps with the goal to assure consistency and cost effectiveness. The first step is planning and proposal, during which individual government agencies assess their needs and submit funding requests aligned with their goals, objectives, and broader fiscal strategies. Once the proposals are consolidated, the budget is submitted to the legislative body for approval. During this phase, the proposed budget undergoes debates and potential modifications to address concerns and priorities raised by legislators. After legislative approval, the budget moves to the implementation phase. At this stage, funds are allocated to the relevant programs and services. The final step in the process is monitoring and evaluation. This involves tracking expenditures and ensuring that funds are used efficiently to meet the intended objectives. Audits and performance evaluations are conducted to maintain accountability and to identify areas for improvement in future budgets.

Based on the analysis conducted under the Task 3 White Paper (attached as **Appendix H**), a zero-based budgeting approach is recommended as it offers a practical and transparent approach for the Authority to manage the financial complexities of building and operating new facilities. By justifying every expense and aligning spending with strategic goals, zero-based budgeting will enable the Authority to anticipate and plan for cost increases while maintaining financial sustainability. When combined with long-term forecasting and performance monitoring, zero-based budgeting can ensure that the authority remains agile and effective in delivering waste management services to meet the needs of the ILA Members.

10.3 LEVERAGING ECONOMIES OF SCALE

Economically, the ILA was designed to streamline and enhance waste management and recycling services by fostering regional collaboration among the county and its municipalities. The primary goals were to reduce costs for ILA Members through economies of scale and more efficient operations, leading to more predictable and stable waste management expenses.

10.4 LEVERAGING EXISTING INFRASTRUCTURE

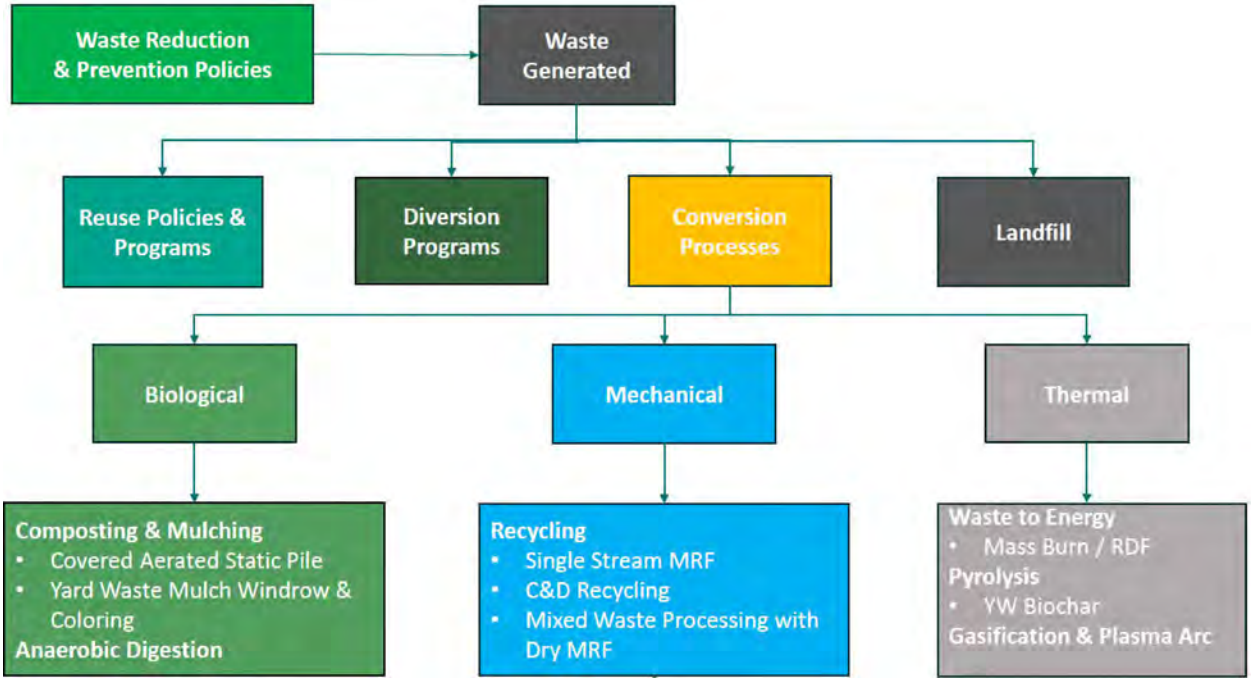
As presented in **Figure 5** above, Broward County has an extensive network of existing solid waste management infrastructure, including publicly-owned citizen drop-off sites, a private recycling facility, several private construction and demolition debris recycling facilities, private transfer stations, a private WTE facility, a County landfill, and a private landfill. This infrastructure meets some of the solid waste management needs of today and is projected to do so for the foreseeable future. However, as the System is further developed, it is critically important that the Authority be prepared to invest in new facilities and/or services to meet the solid waste management needs over the planning horizon. These needs are further discussed below.

11.0 FUTURE NEEDS ASSESSMENT

The Task 4 White Paper was prepared to identify critical information necessary to help the Authority make informed decisions about which types of facilities, policies, and programs should be prioritized in the Master Plan. The Task 4 White Paper is attached as **Appendix I** for reference. Five planning scenarios (Scenarios) were developed to offer potential pathways to meet the Authority's 75% waste diversion goal by 2045. The Scenarios are not intended to be a prescriptive to-do list, but rather to demonstrate the future scale and scope of processing infrastructure and programming needed to meet the Authority's ambitious waste diversion target. This assessment was driven by the Authority's Guiding Principles detailed in **Section 4** above.

The planning Scenarios were developed to provide a range of approaches that could meet the Authority's future needs, with each Scenario having different tradeoffs regarding ease of implementation, cost of service, and overall impact. The Scenarios were informed by a review of municipal best practices and a comprehensive assessment of all available waste processing technologies, including emerging and innovative approaches, as presented below in **Figure 11**.

Figure 11. Overview of Available Waste Approaches and Technologies Analyzed



The planning Scenarios helped determine:

- The volume and composition of waste to be managed now and in the future,
- The best way to segregate the waste stream to enable efficient recycling,
- The types and combinations of processing technologies best suited to increase recycling rates from the targeted waste streams,
- The relative size, capacity, cost, and recycling impact of different material recovery facilities that will increase recycling rates,
- The collection strategies, supporting policies, and public outreach programs needed to complement processing infrastructure to ensure a more sustainable materials management system.

11.1 WASTE GENERATION MODEL

The Scenarios were also informed by population and waste growth trends, presented in **Table 3.** These trends were determined as part of the Model that estimated the tonnage and composition of solid waste and recyclable materials expected to be generated within the County over the planning horizon. The best available data was used to consider the flow of waste through the Authority's solid waste system and out-of-County disposal facilities, encompassing four (4) key phases: generation, collection, transfer/routing, and diversion/disposal.

Table 3. Broward County Population and Waste Generation Over the 40-Year Planning Horizon

Year	2025	2030	2035	2040	2045	2065
Broward County Population Projection	2,020,000	2,090,000	2,140,000	2,190,000	2,230,000	2,402,000
Waste Tonnage Projection	5,320,000	5,690,000	6,000,000	6,260,000	6,500,000	7,200,000

The Model guided the development of the Scenarios that forecast future waste management facility needs, based on the tonnage of waste material required to be managed now and in the future. The Broward County 2023 Waste Characterization Study (attached as **Appendix J**) found that 78% of the County's residential waste stream, 76% of the commercial waste stream, and 80% of the C&D/Bulk Waste stream is recyclable, compostable, or potentially divertible.

11.2 WASTE MANAGEMENT SCENARIO PLANNING OVERVIEW

To meet the Authority's solid waste management and processing capacity requirements over the next 40 years, the Scenarios, summarized and presented in **Figure 12** below, were developed to model different combinations of waste processing technologies to project the estimated recycling rates that could be achieved, the associated development and operating costs, and the ease of implementation.

Figure 12. Scenarios Overview

	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Projected Diversion Rate	62%	79%	83%	51%	73%
Tons Left to Send to Landfill in 2045	2,700,000	1,600,000	1,300,000	3,300,000	2,100,000
New Facilities					
Transfer Stations	3	3	3	3	3
Landfills	1	1	1	1	1
Single-Stream MRFs	2	2	2	0	2
Reuter's Recycling	1	1	1	0	1
MWPF + AD + Fiber	0	0	0	0	3
WTE	0	1	1	0	0
Anaerobic Digestion	0	0	0	3	0
DRY MRFs	0	0	0	6	0
Organics Processing Campus	2	2	2	2	2
Mulch	2	2	2	2	2
CASP Zone	0	1	10	0	10
Biochar	1	1	1	1	1
Existing Facilities					
Drop-Off Centers	8	8	8	8	8
C & D Recovery facilities	2	2	2	2	2

These Scenarios demonstrate that the pursuit of incrementally higher recycling rates leads to substantially higher costs and increased difficulty of implementation. The Scenarios were informed by a comprehensive review of existing and emerging future waste processing technologies implemented across North America and other developed nations, as detailed in the Task 9 White Paper. The Scenarios were screened to assess the relative public health and environmental impacts and the associated environmental justice implications. They also took into consideration comparable municipal solid waste systems, and unique characteristics of the County including geographic constraints, limited land availability, permitting processes at the local and state levels, and the anticipated regulatory framework for stricter segregation of waste streams at the source across residential, commercial, and industrial sectors. **Table 4** below presents the results of this screening process for each Scenario.

Table 4. Scenarios and Goals: Cost and Other Impacts

Scenario	Recycling (Cost)	Reuse (Cost)	Diversion (Cost)	Zero Waste Strategies (Cost)	Market Risks (Cost)	Environmental Impacts, Health and Safety (Cost)	Cost Efficiency
A	Low	Low	Medium	Low	Low	Medium	High
B	High	High	High	Medium	High	High	Medium
C	High	High	High	Medium	High	High	Medium
D	Medium	Medium	Medium	High	Medium	High	Low
E	High	High	High	Medium	High	High	Low

Following the development of the Scenarios and presentation to the Executive Committee, consensus was achieved that **Scenario A offers the most practical, cost-effective, and quickest path forward to begin building the Authority's new solid waste system** while still providing the necessary flexibility for the Authority to adapt and pursue more progressive waste diversion investments over time as the system matures and evolves. For a detailed review of each planning Scenario, including descriptions of the respective technologies, facilities, and cost estimates, refer to the Task 4 White Paper.

Scenario A includes the first critical steps needed for the Authority to be successful — restoring and expanding single-stream recycling access, improving waste diversion opportunities through the harmonization of services and separation of material streams, targeting single-stream recycling and yard trash programs that are easiest to implement while yielding the largest recycling gains, investing in supporting infrastructure and complimentary public education, and ensuring long-term disposal security.

Broward County's distinctive characteristics limit the potential for solid waste diversion during the first few years of the planning horizon, necessitating a practical and phased approach to planning. Additionally, the integration of open market collection systems within the Authority presents challenges to full participation. It is therefore important to acknowledge that (1) all planning Scenarios identified the need for continued use of the South Broward RRF for waste volume reduction; and (2) that additional landfill capacity will be necessary over the planning horizon to manage residual materials, provide added resilience from future debris generating disaster events, and ensure operational stability. Due to the volume of waste projected to be generated in the future, the limited siting opportunities within Broward County, and the growing disposal needs of adjacent counties, the Task 4 White Paper noted that it is imperative for the Authority to actively procure additional disposal capacity within or outside the County as a critical part of its long-term resiliency strategy.

11.3 FACILITY SITING

While Scenario A is the preferred starting point, consideration was also given to siting new facilities. A preliminary desktop facility siting analysis was conducted for the potential development of the facilities identified in all Scenarios featured in the Task 6 White Paper. Exclusionary screening

criteria were developed for each facility type, including minimum site acreage, setback from residential zoning, access to major roadways, and ownership by a municipal government entity. **Table 5** summarizes the criteria used to assess the feasibility of potential sites and denotes facilities specifically recommended by Scenario A. Each of the potential sites must undergo a detailed siting analysis that considers geotechnical subsurface conditions, environmental permitting, design analysis, constructability, etc. While the available public land and the identified existing sites have limitations, the Authority should remain engaged and aware of potential opportunities to acquire land in the future.

Table 5. Siting Criteria Summary

Technology	Capacity Needed Per Facility (TPY)[1]	Minimum Site Area for Individual Facilities (Ac)[2]	Offset from Residential Zoning (mile(s))	Parcel Ownership	Zoning	Transportation – Travel Time to Major Road	Proximity to Airport	Number of Facilities Required by Scenario A
SS RMPF	250,000	20	0.25	Must be County or municipally owned	Vacant, Industrial, Commercial, and Agricultural	Exclude properties more than five miles from a Collector or Arterial Road	N/A	2
Mulch Facility	175,500	10	0.25					2
Biochar	30,000	2	0.5					1
Organics Processing Campus	380,000	10	1.0					2
Aerobic Digester	160,000	7	0.25					N/A
C&D RMPF	450,000	15	0.5					2
Dry MRF	160,000	15	0.25					N/A
MWP (Fiber Extraction, AD & MRF)	330,000	30	0.5					N/A
Public Drop-Off Recycling Center	12,000	0.5	NA					8
Transfer Station	1,240,000	15	0.25					3
WTE[3]	1,000,000	30	0.5				>4 miles	N/A
Landfill	3,400,000	640	1.0				>4 miles	1

1. The modeled functional capacities from the Task 4 White Paper for each type of solid waste facility were estimated based on the requirements to meet the Authority's 2045 diversion goals, based upon modeled waste volumes anticipated.
2. Minimum site acreage shown is for the minimum functional facility footprint that could accommodate the capacity required to meet long-term Authority objectives and does not include appurtenant scales, access and egress roads, local zoning requirements, setbacks, vegetation, fencing, stormwater, etc., which would be determined during a fatal flaw analysis.
3. Scenario A assumes that the existing permitted disposal capacity at the South Broward RRF will continue to be used; however, it does not contemplate a new WTE facility at this time.

11.3.1 Identification of Sites – Exclusionary Criteria

To identify the availability of potential sites for the development of future solid waste, recycling, and diversion facilities within the County, a desktop evaluation utilizing Geographic Information Systems (GIS) was conducted, which applied the exclusionary criteria detailed in the Task 6 White Paper (see **Appendix K**). Only County and municipally owned parcels were considered for this exercise.

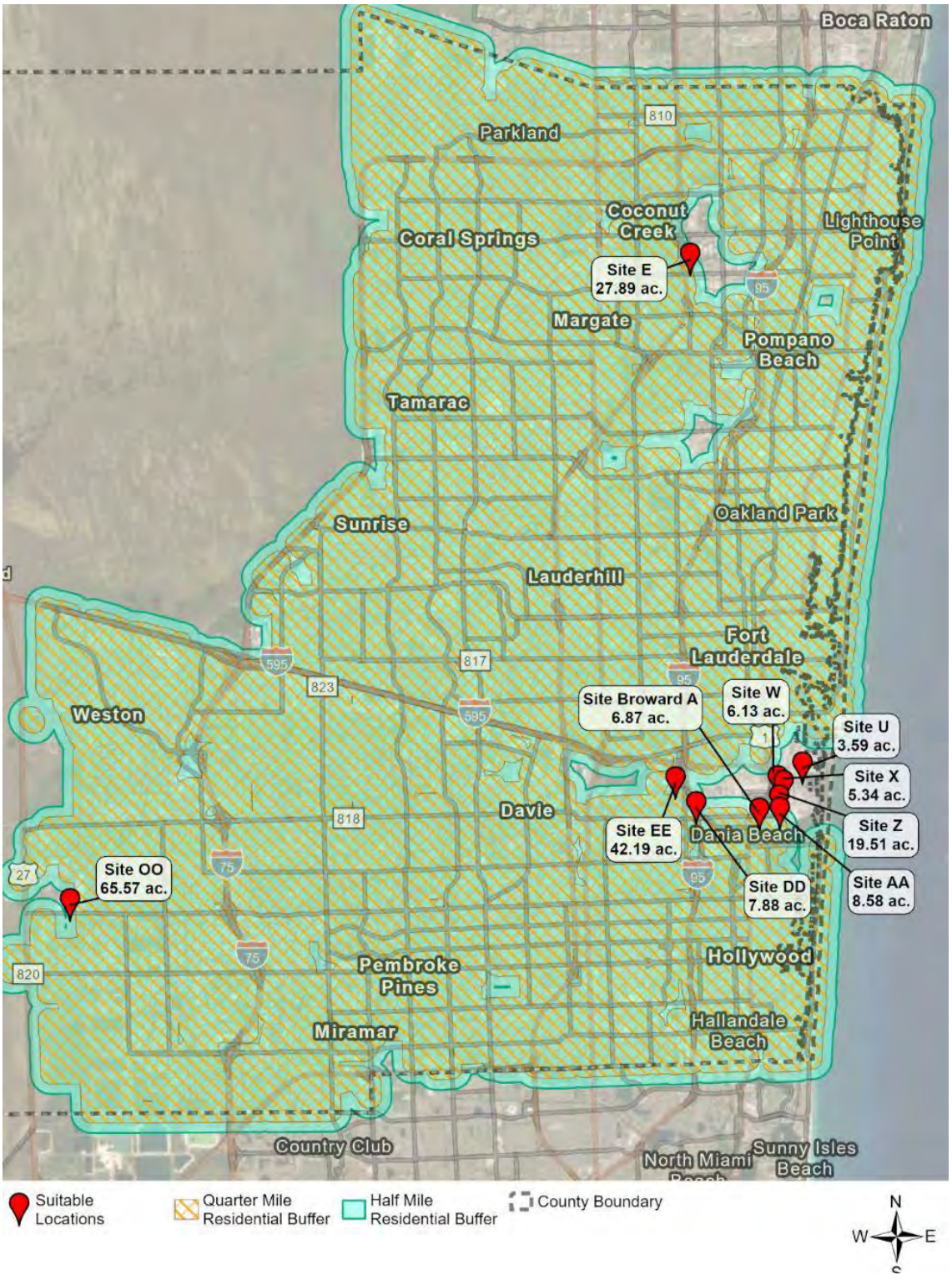
The desktop GIS analysis identified 132 individual County or municipally owned parcels. Broward County provided a listing of 80 additional parcels for consideration, of which 32 were included in the original evaluation. These parcels were grouped into 49 potential sites, which were each assigned a letter site identifier. Once the GIS data and siting criteria associated with each proposed facility type were considered and evaluated for each of the 49 potential sites, many were excluded from further evaluation. Ultimately nine (9) potential sites were identified that could potentially accommodate development of a SS RMPF, Scenario A - Organics Processing Campus (Mulch Facility and Biochar Pyrolysis), Mulch Facility, C&D RMPF, Public Drop-Off Recycling Center, and Transfer Station. Due to the residential zoning offset and minimum site acreage requirement, County or municipally-owned sites were not identified for the development of a WTE Facility or Landfill. However, it should be noted that on July 18, 2025, the Executive Committee made the policy decision that any future WTE Facility would be considered only if it were co-located in close proximity to the South Broward RRF. The South Broward RRF site did not meet the original exclusionary criteria, as it is less than one mile from residential communities.

Table 6 summarizes the acreage of each of the nine sites and notes the Scenario A facility type(s) that could be developed at each site. The sites are also shown on **Figure 13** below.

Table 6. Summary of Potential Sites

Site Identifier	Ownership	Location	Site Size (Acreage)	Scenario A Facility Types
AA	Unincorporated Broward County	East of Ft. Lauderdale International Airport, South of I-595	8.58	Public Drop-Off Recycling Center
DD	Unincorporated Broward County	West of Ft. Lauderdale International Airport, South of I-595	7.88	Public Drop-Off Recycling Center
E (Includes the Alpha 250 Parcel)	City of Pompano Beach	East of the FL Turnpike, South of Sample Road	27.89	SS RMPF, Mulch Facility, Public Drop-Off Recycling Center, Transfer Station
EE	Unincorporated Broward County	West of I-95, South of I-595	42.19	SS RMPF, Mulch Facility, Public Drop-Off Recycling Center, Transfer Station
W	Unincorporated Broward County	East of Ft. Lauderdale International Airport, East of NW 7th Ave	6.13	Public Drop-Off Recycling Center
OO	Unincorporated Broward County	East of I-75, North of Sheridan Street	65.57	SS RMPF, Mulch Facility, Public Drop-Off Recycling Center, Transfer Station
U	City of Hollywood	Southwest of Port Everglades, South of Eller Dr.	3.59	Public Drop-Off Recycling Center
Z	Unincorporated Broward County	East of Ft. Lauderdale International Airport, East of NW 7th Ave	19.51	SS RMPF, Mulch Facility, Organics Processing Campus – Scenario A (Much and Biochar Pyrolysis Facilities), C&D RMPF. Public Drop-Off Recycling Center, Transfer Station
Broward A	Unincorporated Broward County	South of Ft. Lauderdale International Airport, North of NE 10th St	6.87	Public Drop-Off Recycling Center

Figure 13. Location of County and Municipally Owned Sites within Broward County that Meet Screening Criteria



When planning for the development of future Authority-owned facilities, consideration should be given to the ability to activate the infrastructure to also serve as an educational resource to further enhance public awareness and support for the role the facility plays in the community. Such facilities should also promote environmental stewardship through thoughtful design of the built environment. An exploration of such an approach is addressed in the Task 10 White Paper (attached as **Appendix L**). One positive way to engage the community is through passive learning centers. Living laboratories, interactive exhibits, wetlands, and trails are all examples of learning centers that have been successfully incorporated into waste management facilities, fostering environmental awareness and promoting sustainability. The pursuit of LEED certification or similar green building certifications can help ensure optimal energy and water efficiency within the facility operation and highlight the use of waste reduction principles and recycled content within the construction process. Educational signage and public tours of the facilities can provide impactful learning opportunities for students and community groups. For example, both Pinellas County and the Solid Waste Authority of Palm Beach County have robust public outreach programs that provide facility tours. Ensuring adequate buffers and protection of natural areas also helps to minimize disruption to adjacent properties.

11.3.2 Alpha 250 Site

In addition to evaluating other County or municipal owned sites, the Alpha 250 Site was evaluated to determine if any of the solid waste processing facilities identified in the Scenarios could be developed at this location. There are three limiting factors affecting the facility type and size that could be developed at the Alpha 250 Site, including the residential setback from zoning, a Plat Amendment that limits industrial facility development to 342,000 square feet (sf) or approximately 7.85 acres, and the types of facilities included in the City of Pompano Beach Zoning Waste Related Uses listing.

The Plat Amendment allows for additional industrial density square footage, not to exceed 20% of the permitted industrial density, and is dependent on the actual industrial density square footage developed at parcels subject to the Plat Amendment. However, this can only be determined through a formal Zoning Letter request, which would be conducted should the Authority pursue a more detailed siting analysis for the Alpha 250 Site. Therefore, the evaluation of the North Alpha 250 Site is based on the currently known 342,000 sf industrial density limitation.

The Alpha 250 Site is located within the City of Pompano Beach and falls within the City's zoning jurisdiction. The Alpha 250 Site is zoned General Industrial Planned Industrial Overlay (I-1/PCI). Approved uses for this designation are defined in Appendix A to the Overlay: Consolidated Use Table of the City of Pompano Beach's Zoning Code. Waste-related uses are allowed in areas designated General Industrial as a special exception and require approval from the City of Pompano Beach Zoning Board of Appeals (ZBA). The following Scenario A facility types are allowed at the Alpha 250 Site (with special exceptions): Mulch Facility, C&D RMPF, and Transfer Station. The City of Pompano Beach Consolidated Use Table does not include a description of RMPF or Public Drop Off Recycling Centers in its listing of Waste Related Uses. If the Authority would like the City of Pompano Beach to consider development of these types of waste processing facilities, discussions with the ZBA should be held.

Figure 14. North Alpha 250 Setback and Buildable Area

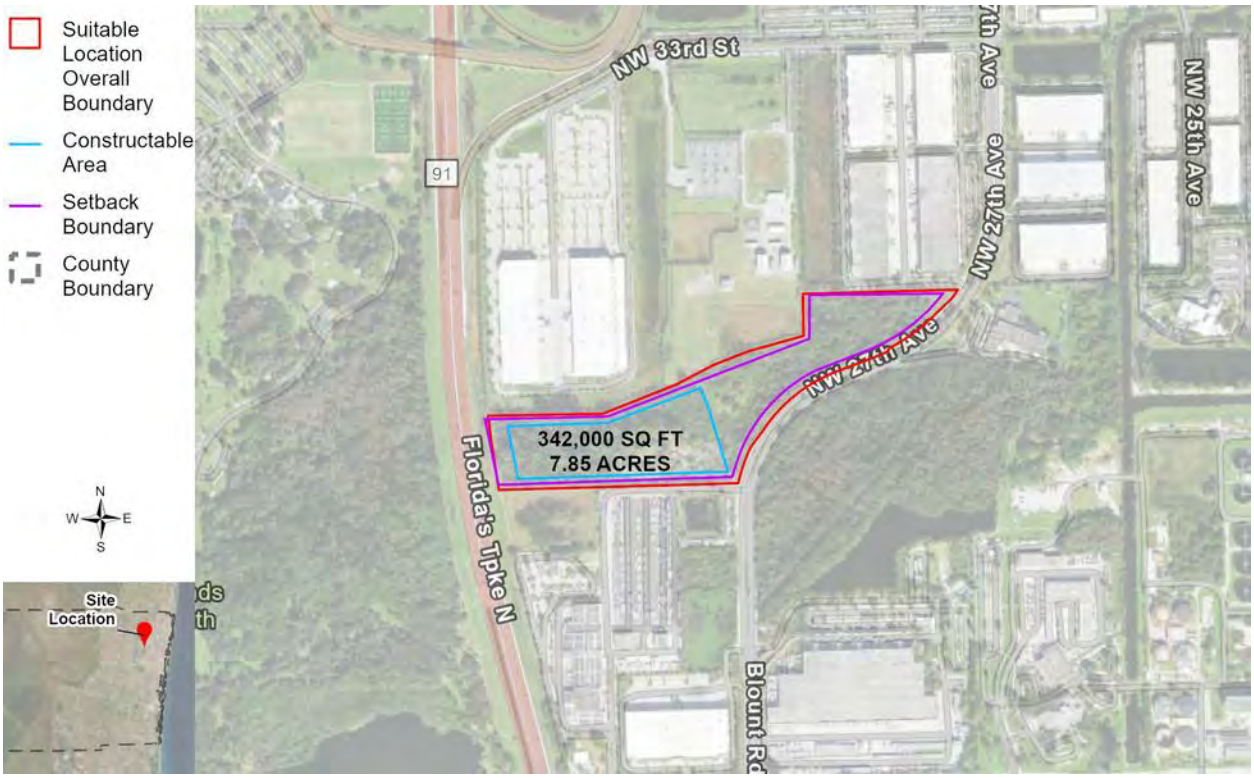


Table 7 summarizes the Scenario A facility types, capacity, and corresponding minimum acreage requirements defined in the Task 4 White Paper and compares available acreage for development, waste-related uses allowed by the City of Pompano Beach, and the minimum setback to residential zoning. This comparison determined that none of the facilities identified in Scenario A could be constructed at the Alpha 250 Site based on the facility capacity noted, minimum acreage requirements, and zoning concurrence. However, if the capacity of the proposed Scenario A facility types were to be reduced, the Alpha 250 Site could accommodate a Mulch Facility or Transfer Station.

Table 7. North Alpha 250 Scenario A Suitable Facilities

Facility Type	Capacity	Minimum Acreage Required Based on Capacity	Available Acreage of Alpha 250 North	City of Pompano Beach Zoning Compliant	Minimum Setback to Residential Zoning	North Alpha 250 Ability to Accommodate Proposed Facilities
SS RMPF	250,000	20	7.85	No	0.25 miles	No[1, 2]
Mulch Facility	175,000	10	7.85	Yes	0.25 miles	No[1]
C&D RMPF	450,000	15	7.85	Yes	0.50 miles	No

Facility Type	Capacity	Minimum Acreage Required Based on Capacity	Available Acreage of Alpha 250 North	City of Pompano Beach Zoning Compliant	Minimum Setback to Residential Zoning	North Alpha 250 Ability to Accommodate Proposed Facilities
Organics Processing Campus – Scenario A (Co-Located Much and Biochar Pyrolysis Facilities)	380,000	18	7.85	No	0.5 miles	No
Public Drop-Off Recycling Center	12,000	0.5	7.85	No	Not Applicable	No[2]
Transfer Station	1,240,000	15	7.85	Yes	0.25 miles	No[1]
Landfill	3,400,000	640	7.85	No	1-mile	No

1. Reduced capacity facility could be accommodated.
2. Discussions required with City of Pompano Beach Planning and Zoning to confirm if it would consider a special exception or an amendment to Appendix A: Consolidated Use Table of its Zoning Code to include the definition associated with a RMPF and Public Drop Off Recycling Center in its list of allowed waste-related uses.

12.0 INNOVATIVE FUTURE TECHNOLOGIES

Broward County and the Authority face increasing waste generation, shifting consumption patterns, staffing considerations, land scarcity, decreasing long-term cost-effective disposal capacity, concerns about GHG emissions from the solid waste system, and intensifying environmental challenges as a result of rapid urbanization. These co-enforcing trends necessitate the need for innovative solutions that increase diversion, enhance efficiency, reduce costs, decrease emissions, and foster environmental stewardship. To help provide solutions to these common urban growth issues, a dizzying array of quickly evolving, cutting-edge technologies is transforming the solid waste management landscape. On multiple fronts, vetting and implementation of these systems should begin in the short term and continue over the planning horizon for increasing recovery rates, optimizing costs, streamlining operations, reducing dangerous and repetitive jobs, and lowering environmental impacts.

To be effective, the Authority must prioritize a more automated and connected management system to commence immediately as a top priority. Led by AI, industrial and public processes are undergoing a revolution as significant as the preceding industrial and digital/computer revolutions of the last two centuries. For instance, the benefits of availing AI technologies as a top priority will provide vast opportunities for the productive and cost-effective development of services and assets and offer a platform for increased engagement with residents. **Table 11 in Section 15 – Recommendations** outlines critical initial elements needed for this approach, their strategies and tactics, and the current priority and time frame.

12.1 TECHNOLOGY PLANNING FRAMEWORK

The Authority should use the following criteria as a technology planning framework to procure technologies that:

- Are low risk and proven to lead to high diversion rates; for instance, best practices for waste reduction and reuse.
- Are practical, competitive, and cost effective, and can be tailored to the Authority's unique geographic and demographic profile, including its coastal location and interconnectivity with neighboring counties.
- Implement continuous improvement – a preference for data-driven accountable metrics that automate repetitive, duplicative, and mistake-prone tasks.
- Provide long-term and sustainable processing, monitoring, communicating, and safety enhancing methods which prioritize and promote operational efficiency and environmental stewardship.

For waste system elements that may be managed by the Authority and ILA Members, most, if not all, key processes (e.g., collection, processing and disposal, procurement capabilities, compliance) could benefit from new technologies and would help drive and optimize Authority business processes. Examples include:

- Providing updated, real-time waste compositions on a continuous basis, either by collection container monitors or through AI recognition technology during processing.

- Integrating smart phone, solid waste customer platforms that are compatible with all other key parts of the management system, including collection schedules, special events, storm response, contamination monitoring, service disruption and missed pickup coordination, service provider communications, etc. These same platforms can also provide interactive billing capabilities and automated customer service functions, with features such as additional service ordering, accident reporting, up charging for exceeding service boundaries, personalized customer education, and feedback on recycling participation and performance.

- Using autonomous and safe vehicles which are appropriate now for some segments of solid waste collection and disposal system, such as 'Wall-E'- type beach and park litter robot patrols and small institutional trash container collection systems (hospitals, campuses, hotels). These systems can also utilize smart bin technology that senses when a container is full and sends the automated collection vehicle to service it. In addition, use of autonomous vehicles in management of sites where waste is processed or disposed in such applications as water sprinkler trucks, windrow turners, security-monitoring vehicles, and landfill compactors, is being field tested and deployed today.

- Monitoring autonomous collection systems which are now in public road testing worldwide and are being developed to service larger segments of solid waste customers in the future (both residential and commercial). Considering the exploding market for autonomous cab and jitney services in large U.S. cities and given driver shortages and system disruptions from other human factors, autonomous vehicles are likely to be implemented more widely in the short term, provided they are as safe, or safer, than human drivers. Implementation will occur first in applications such as transfer station transfer long hauling; second in lower traffic commercial pick-up systems during off hours; and finally in regular residential collection systems.

- Real time monitoring and due diligence for the ILA Member solid waste collection service systems (GPS, stops recorded with date and time stamp, current position, weight-recording alternatives, daily tonnage accumulators at each processing and disposal location, etc.).

- Automated remote scale systems with time monitoring and management to avoid queues and costly manual mistakes.

The opportunities above are examples of the evolving array of technologies Authority members should consider implementing (see the Task 9 White Paper attached as **Appendix M** for more detail). Given the overwhelming number of choices, the Authority should organize to meet its planning framework in the short term. A managed approach will allow quick control and reduce reactive decisions in procuring new technology. It also will allow precise measurement and accountability and pave the way for performance improvement through metrics, leading to improved total costs and a more predictive return on investment. From this foundation, stakeholders will gain actionable options for solid waste collection, processing, recovery, and disposal which have measurable standards and outcomes, and can be geared toward the highest recovery.

The Authority should use the Planning Framework to achieve the best outcomes in the long term. For instance, solid waste system autonomous processes have become readily available in the last decade that are a major trend in the environmental industry. They can significantly reduce costs and

are being implemented rapidly through the supply chain. They are fueled by the new capabilities of AI, blockchain technologies, the Internet of Things, and Web 3.0. architecture. There are also newer, abundant, and very attractive tools and complementary technologies and processes that will be available in three to five years or less. They are also driven by these same developments and will require the new connectivity to be effective and should be complementary to its implementation. **Table 11** in Section 15 – Recommendations outlines critical initial elements needed for this approach, their strategies and tactics, and the current priority and time frame.

12.2 HIGH DIVERSION AND EFFICIENT WASTE MANAGEMENT TECHNOLOGIES

Initially, the Authority will likely remain reliant on the existing infrastructure, while also allowing waste to be transported out-of-County by private service providers to private disposal options. However, there is an appropriate near-term option that relates to managing yard trash and eventually food waste and presents an opportunity to increase diversion rates. Processing can be accomplished initially via mulching/composting with a relatively low investment level, with the processing approach enhanced in the future as required to meet the needs of the Authority. To meet the 75% state diversion goal, a top priority for the Authority should be to isolate, capture, and process streams of organic material that ILA Members are now collecting as part of the solid waste stream and may collect separately in the future. Focusing on organics is the fastest way to increase diversion and has shown the greatest promise among new technologies. In addition, organics technologies are scaling throughout the U.S. and achieving operational resilience.

As a preliminary action, the Authority is encouraged to conduct a yard trash end market assessment and develop an appropriate action plan to create viable end markets for yard trash or develop a procurement approach that would require a contracted vendor to identify secure end markets for processed yard trash. It should be noted that the Broward County Landfill currently has limited need for use of yard trash as alternative daily cover and reports that it currently has excess cover materials. **Table 11** outlines critical initial elements needed for this approach, their strategies and tactics, and the current priority and time frame.

Though not recommended initially due to the risk and cost, the Authority should continue monitoring advanced high volume waste technologies such as those presented in the Task 9 White Paper.

13.0 EDUCATION AND OUTREACH PROGRAM

As previously described above and detailed in the Task 8 White Paper (attached as **Appendix N**), behavior change is foundational to meeting the Authority's waste reduction and recycling goals. For diversion efforts to succeed, the public must take ownership of waste generation and be empowered to reduce waste and recycle more. Community members and visitors need access to the waste reduction and recycling services identified in this Plan, knowledge about how to reduce their waste and recycle correctly, and engagement to help them make informed and accurate disposal decisions about an ever-changing array of waste materials they generate as they live, work, and play across Broward County. As packaging design, recycling innovations, and materials management programs continue to evolve at a faster pace, the Authority needs a robust communications and outreach infrastructure to complement the collections and processing systems. This will help bridge the gap, encourage people to adapt to ongoing changes, and make learning about recycling more accessible, engaging, and rewarding.

Without consistent information, feedback on recycling habits, or a clear resource for answers, people often question the legitimacy of recycling programs and/or create their own recycling methods. For example, the Authority's residential recycling survey conducted in 2025, found that only 43% of respondents trust that recyclable items placed in their recycling carts actually get recycled. Without accurate, timely information, people's recycling assumptions are often based on misconceptions or outdated knowledge, leading to decreased participation and unintentional mistakes. This contributes to contamination of as much as 25% of collected recyclables, which can no longer be processed, as reported by USEPA. This highlights the need for the Authority to invest in developing a communications and outreach program to cut through confusion and become the "trusted voice" to deliver accurate and timely communications to drive desired behavior.

Participation, contamination, and material yield metrics for recycling programs can be improved significantly by investing in the following education and outreach initiatives:

- **Uniformity Across Programs:** Establishing consistency in program design and operations.
- **Targeted Educational Messaging:** Utilizing Community-Based Social Marketing (CBSM) techniques to reach and influence diverse populations effectively.
- **Enhanced Compliance Measures/Enforcement:** Strengthening policies to reduce contamination and ensure compliance.

Ensuring uniformity across programs will be one of the largest contributors to success as it provides the access needed to enable participation. The Master Plan recommends that the Authority retain and expand its current single stream recycling program due to the significant direct cost savings compared to a dual stream system and other related net savings identified in the Task 4 White Paper. Aligning recycling services across ILA Members should also provide for a conforming list of targeted curbside recyclables which is essential to communicating the list of acceptable items, thus reducing contamination and maximizing material recovery. The Master Plan also recommends requiring weekly curbside collection of source separated yard trash to enable targeting the material for beneficial uses. Both of these core weekly curbside collection services are the two largest materials streams in which residents can actively participate in order to increase recycling rates. In addition to these two critical focus areas, **Table 11** outlines critical initial elements needed for this approach, their strategies and tactics, and the current priority and time frame. The Task 8 White Paper also provides more detail and relevant case studies.

14.0 CHALLENGES AND OPPORTUNITIES

Tasks 4 through 9 explored and provided a physical roadmap for diversion. However, for success in implementing some or all of the processing and disposal functions of Scenario A, the Authority will first be required to build a lasting foundation before it invests its own capital and resources to meet the 75% recycling goal. There are lessons from existing municipal solid waste systems with higher recovery in North America (from places as diverse as Florida's Lee and Palm Beach Counties; the province of British Columbia, Canada; Hennepin County, MN; California's high regulatory environment; Phoenix, AZ; and several New Jersey, New York, and Texas municipalities) that began to build greater diversion over decades-long periods through phased foundational steps. These steps then allowed later development of the physical assets, whether public or private, required to meet the volume demand. Successful high diversion communities further recognized the practical tradeoffs that must be made in order to increase local waste authority fidelity and span of control so they could make necessary changes while keeping diverse stakeholders engaged and supportive. This included immediate steps towards solving ever-present potential conflicts and the tradeoffs they represent, with solutions acceptable for stakeholders in their diverse communities. Among the most important of these are:

- Where (land availability, feasibility, community acceptance) and when (cost, volume, competition) to build new solid waste facilities.

- What kind of collection systems must be phased in over the long term to obtain a cost-optimized scale to achieve the highest rates of recovery, whether or not the Authority actually operates those collection systems; and how to implement a phased homogenization of solid waste-segmented materials streams to provide the key Authority leverage point of large volumes for lower costs that members want.

- Immediately begin defining and implementing general policies, contractual agreements with Authority members, collaboration agreements with non-members for regional scale, and supporting local member statutes that will be needed.

- How to plan, procure, and execute an effective communications strategy utilizing a shared high-technology platform, from customer apps to real time system operations, in order to assure widespread and necessary access across the supply chain for common Authority-wide messages; for instance, coordination of material stream composition requirements, anti-contamination programs, special collection programs, and storm response. This also allows the underpinnings of the Authority's mission to be shared through continuing updates on progress towards common goals, metrics, performance, changes in schedule, responses to storms, and general management.

- How to, over time, move towards material stream, collection system, diversion, disposal and other service harmonization whenever possible for economies of scale.

In addition, based on the 2023 FDEP Solid Waste Management Report, the County had a 39% recycling rate for C&D. Based on the opportunity to manage this waste stream component better, the SCS Team evaluated options to manage C&D. These are presented in the Task 17 Construction & Demolition Debris Management Options White Paper attached as **Appendix O**.

15.0 RECOMMENDATIONS

This Master Plan is iterative in nature, and the changes required to implement its recommendations will be challenging; however, it presents the Authority with an opportunity to enhance service delivery and improve environmental outcomes for the community. With continued collaboration, strong leadership, and a focus on the Guiding Principles, the Authority and ILA Member communities can provide solutions that will gradually reduce the amount of waste disposed and increase the recycling and diversion rate, thereby providing long-term benefits. The Task 7 White Paper provides additional guidance on implementation and potential timelines.

The Master Plan is a baseline that serves as a touchstone to guide future program and policy implementation. Accordingly, the Master Plan should be considered a "living document" that is periodically updated in acknowledgement that future needs will change based on variations in the marketplace, population of ILA Member communities, Federal, State, and local laws and regulations, innovations in technology, and lessons learned as the implementation of the various components of the Plan progresses over time. We must build a bridge from the current solid waste management systems of each municipality and the County that act mostly independently of one another with disparate services, messaging, and performance, to a harmonized solid waste management structure of the future. This will be achieved by building the foundational pillars of the bridge to the future, based on policies to be implemented and enforced by all parties to the ILA.

15.1 RECOMMENDED WASTE MANAGEMENT SCENARIO A

Scenario A envisions strengthening the Authority's status quo by implementing thoughtful incremental improvements that can be managed by the Authority more easily as it works to build its institutional abilities while also minimizing disruption to the existing solid waste services provided by the ILA cities. It outlines waste processing approaches that can be executed more quickly to deliver the biggest impact for the least cost, and it will form the cornerstone of the Authority's future waste processing needs while providing flexibility to allow more aggressive policies and infrastructure investments in the future as the Authority matures. Complimentary ordinances, policies, and outreach initiatives will be necessary to require waste segregation that will enable the Authority to direct material to appropriate facilities. In addition (and depending on the procurement approach employed by the Authority to develop new processing facilities), further consideration of local, state, and Federal legislation and local land use must be considered. **Table 8** presents the waste tonnage needing to be managed in 2045 and the projected diversion impact from Scenario A.

Table 8. Scenario A Recovery Tonnages Summary – Estimated Outcome in 2045

Scenario A	Estimated Outcome in 2045
Incoming Tons to New Recovery Facilities	3,800,000
Recovered Tons	3,300,000
Residue Tons	500,000
Traditional Recycling %	54%
Adjusted Recycling % with WTE and Landfill Credits	62%
GHG Benefit (MTCO2e)	1,500,000

Achieving Scenario A outcomes depends on five critical assumptions: (1) enhancing curbside diversion services to all single family residences (i.e., single stream recycling and clean yard trash collection) by all ILA Members; (2) achieving a high capture rate of recyclables from all non-participating waste stream generators (i.e., multi-family, commercial/industrial, away from home generation); (3) effective integration of private service providers to help achieve the goals of this Plan; (4) available funds to build, operate and maintain the extensive network of forecasted facilities; and (5) continued growth in population and waste generation over the planning horizon. Scenario A outcomes also depend on technological trends and outcomes which may change priorities, potentially at a rapid pace. Due to these challenges and constraints, Scenario A should be adopted and vocalized by Authority leaders as a best-case scenario with challenges to overcome.

15.2 FACILITIES OVERVIEW

Scenario A identified material recovery and waste processing facilities that utilize proven technologies to increase recycling rates, and which can be considered for future development by the Authority. It should be noted that Scenario A does not advocate for each facility to be developed, but rather identifies the scale and scope of processing facilities that would be needed to manage future waste volumes in 2045 in order to reach the 75% recycling goal. It should be further noted that the Master Plan does not advocate for a new WTE facility, rather it contemplates using the existing facility. While not considered in the analysis, it should be noted that the existing facility may have the potential to install an additional combustion unit, which would increase processing capacity for the benefit of the Authority. Before investing in developing Authority owned facilities, the initial focus should be on maximizing use of the existing infrastructure for the most cost effective and quickest impact. Only when the use of existing infrastructure is not available or impractical due to excessive hauling distances, or pricing is uncompetitive should the Authority then explore developing Authority owned facilities.

Although Scenario A provides the best estimate for what a future solid waste management system may look like, it should be viewed only as a directional planning tool. The actual tons of waste will be impacted by population growth, commercial development, private sector waste processing infrastructure, development of new facilities, the maintenance of existing facilities, or the lack thereof, and the degree of success in influencing behavior changes over the planning horizon, in addition to a myriad of other factors, including the trend towards greater implementation of extended producer responsibility frameworks, the continued evolution of packaging design, and the pending impact of transformational technology in the form of AI, etc. Twenty years is a long time, and each decision along the way will need to be based on the then-current realities of the solid waste system and local market conditions.

Table 9 presents the recommended program components and facilities envisioned by Scenario A.

Table 9. Overview of Scenario A

Scenario	Programs	Additional Facility Needs and Capacity of Each Facility - Tons Per Year (TPY)	Target Diversion Rate Increase
A	• Reduce MSW collection to 1x/week • Restore Recycling Services to 20% of Broward County • Add segregated Curbside Yard Trash (YT) Collection • Add Food Waste (FW) Drop-Off Events • Add Permanent Household Hazardous Waste (HHW)/ Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and diversion programs and policies.	• Two (2) Single- Stream Material Recovery Facilities (250,000 TPY each) • Two (2) New Organics Processing Sites with: Two (2) Mulch/ Colorizing Operations (175,000 TPY each) and One (1) New Biochar Pyrolysis operation (30,000k TPY) • Two (2) C&D Recovery Facilities (450,000 TPY each) • Eight (8) Permanent Drop-Off Centers (2,400 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • One (1) Landfill	+25 percentage points to 62%

15.2.1 Scenario A – Processing Facilities

15.2.1.1 Municipal Solid Waste

Currently, MSW is hauled either directly to the South Broward Resource Recovery Facility (RRF) or to transfer stations throughout the County, including Waste Management (WM) Davie, WM Deerfield, and Waste Connections Pembroke Park. MSW is then sent to landfills including Broward County Landfill, J.E.D Landfill, Medley Landfill, Okeechobee Landfill, Desoto Recycling & Disposal, and the Monarch Hill Landfill. Ash from the South Broward RRF is then disposed at the South Broward Ash Monofill.

Scenario A recommends the construction of three transfer stations to supplement the existing private transfer stations in the market in order to support the efficient flow of material to disposal facilities. Ideally, the transfer stations would be located strategically within the County (e.g., northern, central, southern). Scenario A assumes that the existing permitted disposal capacity at the South Broward RRF will continue to be used. It should be noted that WIN Waste Solutions, Inc. (WIN Waste) recently announced the pending sale of the South Broward RRF, and as such, new contract terms and conditions with a new owner/operator may be required for continued use of this disposal capacity. In addition, Scenario A contemplates the development of a new landfill while recognizing that existing landfill capacity may continue to be utilized in the future. However, consistent with the Authority's direction to "control its solid waste management destiny", the SCS Team has assumed that a new landfill, or an existing landfill with capacity that can be secured by the Authority, will be required. An increasingly viable option is to utilize rail hauling to direct waste to a regional landfill.

15.2.1.2 Single-Stream Recycling

Currently, the Authority's ILA members process their SSR at WM's Reuter Facility, with processing fees ranging from $90 to $200 per ton depending on each community's respective contract provisions and how those contracts handle recycling commodity revenue sharing. The Authority should ensure that future recycling processing contracts thoroughly contemplate the value of the recycling commodities sold to market and include provisions whereby the commodity revenues are shared between the MRF operator and the Authority to align incentives to reduce inbound contamination and produce high-quality outbound materials that can be readily marketed. WM is constructing a new, state-of-the-art, 127,000-square-foot RMPF adjacent to the Reuter Facility. This $80+ million RMPF will have a processing capacity of 66 Tons Per Hour (TPH), equivalent to 260,000 TPY, and is referred to as the WM Recycling South Florida (WM South Florida Facility). While the region's current SS processing capacity theoretically is sufficient for 2023 tons, Scenario A includes the development of two additional SS RMPFs to manage the additional volume of inbound tons projected to be generated in 2045. See the Task 4 White Paper for an expanded discussion of the SS RMPF, options, costs, and timeline.

15.2.1.3 Organics Processing Campus

Scenario A includes two Organics Processing Facility campuses with the ability to scale operations to meet additional processing capacity needs. Under this scenario, the facilities will process yard trash via two Mulch/Colorization operations and one Biochar Pyrolysis operation.

The mulching process will involve grinding yard trash, removing contaminants, and stockpiling materials in windrows for further decomposition and processing. To address challenges in the regional market for mulch and soil amendments, incorporating a colorization process is recommended to enhance product marketability and increase revenue potential.

Additionally, the pyrolysis of yard trash—particularly fibrous materials which are slower to decompose such as palm fronds and trimmings—can provide operational flexibility for organics processing. This also creates market opportunities for biochar, a valuable end product with various applications in agriculture, landscaping, and environmental remediation.

15.2.1.4 Construction & Demolition RMPF

Current C&D processing facilities appear to have sufficient capacity to handle the existing tonnage under existing market conditions. However, it should be noted that the WM Monarch Hill Landfill is used to dispose of C&D components that are not segregated for recycling and sale to the secondary market. Further, as tonnage increases and new policies or market developments enhance materials recovery and marketability, additional facilities are anticipated to be required to meet the growing demand.

To address these future needs, assuming that adequate secondary markets exist, it is recommended to establish up to two strategically located C&D RMPF facilities to expand the region's C&D processing capacity. Each facility should be designed to process up to 450,000 TPY (equivalent to 100 TPH) to accommodate the estimated 850,000 TPY of C&D materials requiring processing. These facilities may be publicly or privately owned and operated, depending on regional needs and stakeholder preferences.

15.2.1.5 Drop-Off Centers for Hard-to-Recycle Materials

Permanent Drop-Off Centers. To strengthen recovery efforts, all five scenarios include the development of eight recycling drop-off centers. Each of these permanent facilities will consist of two distinct areas:

1. One gated and staffed area, operating up to two days per week, dedicated to the collection of HHW and electronics.

2. A second, publicly accessible area, open 24/7, for the drop-off of SS recyclables and textiles.

Each site should allocate a minimum of approximately 0.25 to 0.5 acres of operational space for material handling and storage. Materials will be collected using various container types, including roll-off containers, Gaylord boxes (large, corrugated cardboard boxes designed for bulky or irregularly shaped items), and metal donation bins. To support efficient operations, each site should be equipped with two shipping containers designated for the storage of HHW, paint, and electronic waste. Additional site requirements include one electric pallet jack and four roll-off containers.

Although illegal dumping and scavenging are common concerns at public drop-off sites, there are many examples of successful 24/7 drop-off facilities across the United States. The added accessibility and convenience of these facilities, especially to those without curbside recycling access, outweighs the effort to keep the facilities clean and well maintained. A few examples of jurisdictions with 24/7 drop-off facilities include:

- Pinellas County, Florida
- Dunedin, Florida
- Bradenton, Florida
- Cincinnati and several other jurisdictions in Ohio
- Emmet County, Michigan
- Alexandria, Virginia

Municipalities use a variety of strategies to mitigate illegal dumping and scavenging concerns at 24/7 public drop-off facilities, with each community needing to be flexible to adapt to local behaviors and be responsive to differences between individual facility locations. Common strategies include:

- Placing drop-off sites in busier locations with more people around helps to serve as a deterrent to bad behavior. Some communities co-locate drop-off sites at existing solid waste facilities, sheriffs' offices, fire stations, and public parks where municipal staff can more quickly help identify illegal dumping and alert the appropriate solid waste staff to respond.

- Well-placed signage and site lighting are essential.

- Closed Circuit Television (CCTV) cameras are recommended for monitoring and deterring illegal dumping.

- Some communities place fencing and gates around their facilities and require a driver's license to be scanned before entry or, alternatively they require patrons to register with

the municipality and obtain a unique membership code to enter to be granted site access.

- Some municipalities engage community groups to help monitor and promote sites, similar to adopt-a-road or community garden programs, as a means of fostering community pride in the facility and support to keep it clean.

- Other jurisdictions partner with law enforcement and/or code enforcement agencies to make periodic stops at the facilities or ramp up their presence when illegal dumping or scavenging is occurring to serve as an additional deterrent. Code Enforcement departments are often willing to investigate the illegally dumped materials to see if there is any identifying information that can lead to a suspect with a follow-up warning visit to alleged perpetrators.

- Communities can also leverage their service delivery contracts to include contract provisions that require contracted recycling or HHW collection staff to make efforts to clean the sites when they service containers and/or report litter, illegal dumping, or suspicious activity. Other jurisdictions include contract line items to have a means of paying a contractor to respond quickly to remove illegal dumping on a per incident basis in the event municipal staff are not available.

In all instances, a quick response to remove illegal dumping is the best practice and is essential to reducing additional illegal dumping. Data shows that litter attracts more litter based on people's perceptions of a specific place and how well it is maintained, whether a public park, parking garage, or recycling drop-off facility.

15.2.1.6 Waste-to-Energy

Scenario A assumes that the existing permitted disposal capacity at the South Broward RRF will continue to be used. A new WTE facility is not contemplated at this time. Note that WIN Waste recently sold this facility to FCC Environmental Services, and as such, future contract terms and conditions with a new owner/operator may be required for continued use of this disposal capacity. Given the sensitivities surrounding the use of WTE, the Executive Committee directed the SCS Team to prepare a White Paper providing a consolidated reference guide of published resources, reports, and studies regarding the health impacts which may be associated with WTE, which is presented in **Appendix P**. On July 18, 2025, the Executive Committee clarified that any future new WTE facility would only be considered if it were co-located in close proximity to the South Broward RRF. It should be noted that the South Broward RRF site and surrounding parcels were not evaluated as part of the Master Plan siting analysis. Therefore, based on this policy direction from the Executive Committee, it is recommended that the South Broward RRF campus and adjacent parcels of land be evaluated for additional WTE capacity feasibility at some point in the future. In addition, one pathway to monitor the role that WTE can play as part of an integrated and sustainable solid waste management program is to establish a WTE sub-committee to the Governing Board, which can serve to keep the Authority engaged with the new owner of the South Broward RRF to ensure processing Broward County tons remains the priority at this facility as opposed to processing out of County tons, while also ensuring members of the committee stay informed about relevant future changes in the WTE industry given its role as a MSW management facility during the planning horizon.

15.2.2 Scenario A - Outcomes

Scenario A aims to strengthen the Authority's status quo by updating the recycling and organics recovery program through establishing additional infrastructure and negotiating access to existing capacity at the SSR Reuter Facility. **Table 10** presents the diversion facilities and capacity required, capital cost, operating cost, and summary of processing fees under Scenario A.

Table 10. Scenario A - New Diversion Facilities and Capacity, and Estimated Costs and Fees in 2025 Dollars

Description	Qty	Capacity (TPY/Facility)	CapEx/ Facility	Annual OpEx/ Facility	Processing Fee ($/Ton)	Aggregated ($/Ton/Facility)
SS RMPF	2	250,000	$72M	$14M	$89	$35
Yard Trash Mulch Facility	2	175,000	$5M	$1.8M	$14	($32)
Biochar Pyrolysis	1	30,000	$10M	$700k	$57	$13
C&D RMPFs	2	450,000	$41M	$19M	$50	$60
Public Drop-Off Centers	8	12,000	$140k	$1M	$86	$86
Transfer Stations	3	890,000	$47M	$31M	$87	$27
Landfill	1	3M	$880M	$229M	$91	$41

15.3 DIVERSION OPPORTUNITIES

Meeting the Authority's diversion goals demands a major shift in behavior and operations to manage waste upstream, at the point of generation, before materials become commingled and thus more costly to recover. Harmonizing collection and processing approaches that maximize the source separation of waste materials into more homogenous waste streams better enables materials to be recycled. Ensuring uniformity across diversion programs establishes consistency in program design and operations, allows for more efficient management of waste streams, and enables more impactful educational messaging that will work to change behaviors towards adopting waste reduction and recycling participation habits. Increasing public awareness of and participation in the uniform waste diversion services provided will lead to cleaner source separated waste streams that are more easily and cost-effectively targeted for recycling.

After a comprehensive analysis, it is recommended that the Authority utilize single-stream recycling collection as the preferred approach to curbside recycling. Single-stream recycling offers significant cost savings compared to dual-stream recycling as further detailed in the Task 4 White Paper. Expanding the service to residents who do not currently have access is one of the best immediate diversion opportunities.

Scenario A identified the need to require residential yard trash to be collected separately at the curb to enable processing into mulch and biochar. It envisions a colorization process to treat the mulch derived from yard trash processing as a means of increasing the marketability and revenue

associated with the final mulch product. The market for mulch and soil amendments in Broward County is limited. Estimates using the Mulch & Soil Council methodology suggest a total market size of approximately 74,000 TPY for mulch and 33,000 TPY for soil amendments such as compost and topsoil. However, recycled organic waste-based mulch and compost face competition from traditional wood mulch and premium organic compost products. Additionally, the high concentration of palm material in regional yard trash poses challenges to degradation during processing, thus the utilization of pyrolysis processing to produce biochar is recommended to help address this concern.

To address these challenges and improve the viability of organics processing by the Authority, several additional strategies are recommended:

- **Biochar Pyrolysis Unit:** Incorporating a pyrolysis unit to process hard-to-decompose organic material, such as palm waste, into biochar. Biochar offers additional market opportunities and supports soil health initiatives.

- **Colorizing Process:** Adding a colorizing step to enhance the aesthetic appeal of recycled mulch products and increase market competitiveness.

- **Trained Salesforce:** Employing a highly trained salesforce to promote end products effectively, ensuring market penetration and customer education.

By implementing these measures, the Authority can develop a more robust and sustainable organics processing system that addresses existing challenges and maximizes resource recovery.

The policies described below represent the initial recommendations, based on findings from the various White Papers developed throughout the planning process, and informed from years of specialized solid waste and recycling consulting experience. The recommended policies were developed to achieve a step-by-step progression of activities necessary to implement the goals of the Authority in the short, mid, and long term.

Achieving the goal of 75% diversion will be challenging and will require long-term commitment and funding to continuously educate the public about consumption practices, waste generation, consequences of today's continued disposal practices, trade-offs in taxes and fees, and lifestyle choices to change the established habits of a culture of throwaway conveniences.

Table 11 presents critical elements, strategy and tactics, and the priority and timeframe related to policies and regulations, innovative technologies adoption, organics management, and education and outreach that are recommended to support the development and deployment of Scenario A.

Table 11. Recommended Critical Elements, Strategy and Tactics, and Priority and Timeframe

POLICIES AND REGULATIONS		
Recommended Element	**Strategies and Tactics**	**Priority/Time Frame**
Harmonize minimum curbside waste collection standards	• In collaboration with ILA Members and legal counsel, begin the process of drafting an Authority approved procurement template for collections and processing services to be used by ILA Members as existing agreements begin to expire, with the intent to align curbside services to a minimum of one MSW, one single stream recycling, and one yard trash collection per week: o Implement and enforce a uniform requirement in franchise agreements and service contracts to collect and report data on tonnages collected, material types, waste composition, contamination rates and other information determined to be useful to ILA Members and the Authority. This data will provide valuable information for use in making improvements to the solid waste system and adjusting public education, outreach or solid waste management practices as needed across the Authority; o Develop underlying foundational policies including mandatory residential recycling, utilization of advanced mobile customer and service provider interfaces to improve communication, increase home recycling access, and procurement terms which ensure competitiveness for processing facilities and operating contracts; o Execute longer-term franchise agreements for residential collection contracts because responsibility for the waste transfers to the service provider after collection in exchange for geographical exclusivity and so does managing that waste for meeting the goals of the Authority. Require lower GHG-producing collection vehicles, truck monitoring of contamination in real time, and safe efficient behaviors on-route. Franchise agreements have been shown to be effective ways to increase landfill diversion on the West Coast and are prevalent there for that reason; and o Evaluate dividing the County into several franchise residential collection zones that would each be serviced by a single vendor. The franchise zones would be competitively bid, and no collection vendor would serve more than two zones to stimulate competitive pricing. This would leverage the economies of scale for collections and help reduce costs burdened by the public. Similar franchise zones have been successfully implemented in other Florida counties (e.g., Duval and Hillsborough) and would be a consideration after the Authority is established. • Require waste to be source separated at the curb. • Require a minimum of 1 MSW, 1 recycling, and 1 yard trash collection per week (note: municipalities may provide higher levels of service if desired). • Work with ILA Members to develop curbside setout parameters: o MSW; o SS Recycling; and o Yard trash. • Develop model language for ILA Members to codify via ordinances to ensure their respective Code Enforcement departments can enforce common standards. • Develop communication pieces to inform residents about any changes to curbside services. • Develop model contract language for ILA Members to use when procuring new collection contracts.	High/Immediate Adoption
Expand single-stream recycling access	• Ensure all single-family homes with four units or less are provided once-a-week curbside recycling collection service. • Begin to harmonize the list of acceptable recyclable materials. • Expand recycling to multi-family properties. • Expand access to recycling in public spaces. • Develop a mandate to require recycling by commercial and industrial entities.	High/Immediate Adoption
Require yard trash to be recycled	• Ensure all single-family homes with four units or less are provided once-a-week curbside yard trash collection service. • Establish collection zones that can be competitively bid to procure a private sector solution to provide yard trash processing. Note this approach will be quickest to implement and if it does not generate enough additional recycling an Authority owned organics processing facility can be pursued. • Mandate the use of recycled yard trash recovered from local diversion programs to be used at municipal facilities.	High/Immediate Adoption
Enact a mandatory C&D recycling ordinance	• Require C&D recycling prior to landfill disposal. • Applicable to various construction and demolition projects, including residential and commercial construction exceeding certain values, alterations, and roofing projects that involve the removal of old roofing materials. • Modify the building permit system requiring that material weight recycled be estimated and calculated as part of the permit application, and the permittee would be required to provide receipts for the weight of material recycled (minimum what was calculated in the permit application) to close the permit and receive a Certificate of Occupancy. • Incentivize deconstruction over demolition. • Incorporate a fee structure aligned with the type and scope of each project.	High/Immediate Adoption

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Develop additional residential drop-off centers for hard-to-recycle and hazardous materials	• Create a capital improvement plan to fund the development of new drop-off facilities. • Promote drop-off centers as convenient recycling options for multi-family residents who do not have access to curbside recycling. • Utilize drop-off centers as outreach posts to engage with residents. • Procure service delivery contracts to ensure proper management of received materials (e.g. batteries, used oil, scrap metals, white goods, household hazardous waste). • Focus on fostering waste reduction via developing reuse opportunities that may be best co-located at drop off sites. Examples include Sarasota County's Re-Uz-It Shop (https://www.scgov.net/government/solid-waste/the-re-uz-it-shop) or Hillsborough County's award winning partnership with Goodwill Industries to have donation stations at drop-off sites (https://baynews9.com/fl/tampa/news/2023/05/03/trash-or-reuse--pilot-program-turns-discarded-items-into-donations).	High/Short-Term
Enact a mandatory commercial recycling ordinance	• Develop non-exclusive commercial collection franchises which likewise require haulers to carry out actions to meet Authority goals, include the provision of accessible reporting data on collection containers weights and services utilizing County interfaces in real time, and could be coordinated to utilize County-certified recycling facilities.	High/Short-Term
Begin to develop food waste collection	• Select which of the three strategies identified in Scenario A, or a combination of them, is the best fit for ILA Members to start targeting food waste: o Establish food waste drop-off at special events; o Install food waste drop-off sites to be co-located at municipal facilities (i.e. recycling drop-off centers, libraries, senior centers, etc.); and o Establish curbside food scrap collection. • Procure a contract with a permitted facility capable of processing food waste,	Medium/Short-Term
Implement supporting policies and actions	• In collaboration with ILA Members, explore implementation of low-cost waste reduction programs such as supporting backyard composting as a means of reducing food waste entering the collection system (as has been implemented by the City of Tampa) and/or establish strategic partnerships with aligned organizations such as the donation collection program established by Hillsborough County and Goodwill Industries Suncoast to increase material reuse at their drop-off facilities. • Mandate recycling at all municipally owned facilities to lead by example, • Consider partnering with the State and perhaps the Federal Small Business Administration (SBA) to offer grants and/or low-interest loans to stimulate the development of recycling businesses in Broward County. • Consider intensive and coordinated lobbying efforts at the State level aimed at revising the rules related to preemption and food waste. Currently, local governments cannot ban the sale and use of single-use products within their municipal boundaries. Additionally, food waste is currently regulated as solid waste in Florida, both of which are highly restrictive and a significant limiting factor for the reduction in single-use items as well as the development of large-scale food waste diversion programs. • Note policy formation will be an ongoing effort given the staff time, public education, and implementation timelines required of each. It's recommended to only focus on each major policy enactment one at a time.	High/Short-Term to Mid-Term
Establish WTE Sub-Committee from ILA member communities to research and provide recommendations on overarching strategies, technologies to pursue, and schedule of implementation.	• Establish authority of WTE Sub-Committee. • Initiate and define the scope for an evaluation of the South Broward RRF Campus and adjacent properties in order to explore the feasibility of expanding WTE capacity at or near the Campus.	Medium/Short-Term to Mid-Term & Ongoing
EDUCATION AND OUTREACH AND COMMUNICATION PLAN		
Recommended Element	**Strategies and Tactics**	**Priority/Time Frame**
Invest in developing a sustained communications and outreach program	• Dedicate sufficient funding to engage with residents frequently to drive and support behavior change. • A strong investment is necessary to ensure people are well-informed and motivated to recycle. This strong investment can boost a recycling rate beyond levels that could be achieved with infrastructure improvements alone. Research in various U.S. communities conducted by The Recycling Partnership, a national nonprofit that is the gold standard on recycling education, found that combining access to recycling with comprehensive education not only improves and maintains high recycling rates but also results in cleaner materials. • Develop and execute a comprehensive communications, education, and outreach implementation plan that will identify how to best prioritize outreach efforts. • Ensure all ILA Members begin to use common terminology, slogans, and Authority branding to harmonize public knowledge of recycling services including how to participate correctly. • Partner with the ILA Members and key community stakeholders, such as Broward County Schools and the Florida Panthers, etc., to reach target audiences in multiple ways via a trusted source in the community to reinforce the Authority as the go to "trusted voice" for recycling related information and guidance as described in the Task 8 White Paper. • Continue to utilize surveys and focus groups to better identify obstacles to behavior change, communication preferences, motivation factors, and better help tailor educational materials to meet customer needs.	High/Immediate Adoption & Ongoing

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Become the trusted voice to deliver waste and recycling related information	• Build public trust through transparency and education. • Develop a new webpage to serve as the education hub landing page used by all ILA Members when marketing programs and in media engagements. This is needed to position the Authority as the trusted source of the most updated and accurate information on proper recycling and disposal. See www.TampaBayRecycles.org and www.CentralFloridaRecycles.org as examples of how web traffic can be focused on one webpage and then direct visitors back to their respective ILA Member websites for customer service related information until the Authority's capabilities increase over time.	High/Immediate Adoption & Ongoing
Partner with a wide range of stakeholders to increase engagement with their networks	• Reach out to special interest groups, homeowner associations, retailers, schools, sports organizations, business organizations, local media personalities, museums, religious and service-oriented organizations. • A trusted messenger is vital to a behavior change campaign. A message can be 100% on point, but if it does not come from someone trusted by the audience, the message may not be absorbed, and the behavior may not change. • Partner with the ILA Members and key community stakeholders, such as Broward County Schools and the Florida Panthers, etc., to reach target audiences in multiple ways via a trusted source in the community to reinforce the Authority as the go to "trusted voice" for recycling related information and guidance as described in the Task 8 White Paper. See example of how Hillsborough County, FL partnered with the Tampa Bay Lightning on an anti-litter campaign: https://hcfl.gov/residents/property-owners-and-renters/trash-and-recycling/anti-litter-campaign. • Partner with sister departments and agencies within the ILA Members to crowdsource the dissemination of key outreach materials on proper recycling as part of their normal outreach efforts. For example, collaborate with water conservation teams, parks and recreation departments, and other environmentally adjacent staff to have recycling do's and don'ts lists on their respective outreach tables to help reach larger audiences. • Utilize partnerships to find innovative ways to reach people, such as recycling art contests in local schools. For example, see the City of Tampa's program where they have an annual poetry and art contest where the winning poetry is displayed at public parks and artwork gets wrapped on recycling collection trucks which are then seen performing collection on routes throughout the community (https://www.tampa.gov/solid-waste/3rs-art-contest-winners).	High/Short-Term Adoption & Ongoing
Communicate with the community in multiple ways via a combination of approaches	• Utilizing a combination of communication approaches is important to reach people where they are, such as utility bill inserts, direct mailers, media interviews, webpages, cart hangers, social media, outreach events, neighborhood or business newsletters, advertising, etc. • A recommended best practice is to send a mailer to residents three times a year that they can hang on their refrigerator or prominent place to confirm their collection days and what materials are and aren't supposed to be recycled. • Sending a postcard that specifically focuses on the top contaminant in the recycling program is another best practice. • Use technology to reach people on their smart phones via traditional social media channels (i.e., Facebook, X (formerly Twitter), Tik Tok, Instagram, etc.) and the use of apps. • Actively pursue earned media attention, such as frequent interviews on local TV and radio, to promote key messaging which is often more effective at driving engagement at no cost except for staff interview preparation. • Consider paid advertising, but primarily when promoting a targeted educational campaign and when data driven. Social media advertising can be cost-effective to reach target audiences.	High/Short-Term Adoption & Ongoing
Utilize existing and emerging technology to better engage with residents	• WasteWizard or comparable search widgets can be inserted into the Authority's outreach landing page and enable people to search on how to properly recycle or dispose of items. These tools can provide valuable data to guide developing targeted messaging around best practices for managing the most searched items. • Use smartphone apps to send out messaging regarding collection schedules, focused educational campaigns, special collections, etc. • It's vital to use data to verify results, such as reporting on web traffic visits to web pages and correlating what drove the increased engagement. For example, Hillsborough County, FL found that local TV news interviews greatly increased web traffic to recycling guidance vs paid advertising. • Continuously monitor and adopt emerging technology described in Section 12 above and the Task 9 White Paper, such as the use of cameras on collection vehicles to identify contamination at the source and automate notices to the perpetrating households. • Consider how the various technologies can complement each other and be further integrated into the communications and business infrastructure to provide a seamless user experience, useful data, and real-time feedback on operations.	High/Short-Term Adoption & Ongoing
Develop additional residential drop-off centers for hard-to-recycle and hazardous materials	• Utilize drop-off facilities to engage with the public via signage and outreach tabling events. • Use the sites to gather feedback from residents via in person surveys. • Use the sites to conduct media interviews as local news outlets prefer live action shots with visuals readily available to attract viewers.	High/Short-Term Adoption & Ongoing
Set clear, achievable milestones and develop uniform reporting	• You can't manage what you can't measure and therefore the Authority must work collaboratively with the ILA Members to develop key reporting metrics and to standardize the data being collected and reported over time. • Celebrate success when key goals are achieved or milestones occur such as when local businesses implement new recycling programs.	High/Short-Term Adoption & Ongoing
Leverage Future Authority Facilities as Outreach Hubs	• Consider incorporating educational centers, passive learning opportunities, and enhanced preservation of natural areas when planning to develop future facilities. • Utilizing public infrastructure to serve as an educational resource can further enhance public awareness and support for the role the facility plays in the community, with such facilities also being able to promote environmental stewardship through thoughtful design.	Low/Long-term Consideration

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	• Living laboratories, interactive exhibits, wetlands, and trails are all examples of learning centers that have been successfully incorporated into waste management facilities, fostering environmental awareness and promoting sustainability. • The pursuit of LEED certification or similar green building certifications can help ensure optimal energy and water efficiency within the facility operation and highlight the use of waste reduction principles and recycled content within the construction process. • Educational signage and hosting public tours of the facilities can provide impactful learning opportunities for students and community groups. Both Pinellas County, FL and the Solid Waste Authority of Palm Beach County have robust public outreach programs that provide tours of their facilities. • Ensuring adequate buffers and protection of natural areas also helps to minimize disruption to adjacent properties.	
INNOVATIVE TECHNOLOGIES ADOPTION		
Recommended Element	**Strategies and Tactics**	**Priority/Time Frame**
Adoption of a preference for autonomous processes and continuous improvement utilizing AI, blockchain, Web 3.0, and Internet of Things (IoT)	• Including appropriate focus in procurement policies and related requirements and execution plans.	High/Immediate Adoption
Management System which maximizes cross-platform compatibility and connectivity	• Data accessibility and Integration of all ILA Members (e.g., contracts, permits, costs, systems). • Platform-wide harmonized goals and metrics for success. • Uniform messages to/from all members and member platforms for solid waste services and specifications. • Reporting systems. • Uniform minimum service levels. • Customer communications. • Vendor communications. • Customer services. • Real time physical and cost measurement. • Real time feedback. • Billing platform interface. • Automated updated waste characterization. • All assets and supply chain players utilizing the same tools which talk to each other.	High/Short-Term
Develop overarching Strategies for new technology implementation within Authority Control Familiarize the Authority and ILA Members with available choices for each prioritized technology component	• Analyze and develop list of most important system components with the biggest impacts to meet Authority goals and guiding principles. • Establish current performance baseline within Authority footprint, and potential impacts from utilization. • Provide analysis on how New Technologies will meet the goals of the Planning Framework. • Prioritize based on cost savings including CAPEX, system improvement magnitude, and increased management span capabilities for the Authority and ILA Members. • Explore functionality, cross connectivity, and cost options. • Include baseline Safety and data security requirements. • Procurement search for qualified providers of the most important technologies with the appropriate guarantees with the lowest costs.	High/Short-Term
Establish robust Technology Needs Committee (TNC) from ILA Members to (among other functions, see below) research and provide recommendations on overarching strategies, technologies to pursue, and schedule of implementation	• Establish authority of TNC. • Analyze and decide upon breadth of a baseline Enterprise-wide connected system: o Member Terminal, websites, and common APP platforms; and o Cell Phone Based Employee and customer system. • Adoption of supportive tools and systems (e.g., drones, GPS, apps, real time traffic reports, services disruption prediction) which support enterprise.	High/Short- to Medium-Term
Common network of tools	• Specific communication technologies – allow all ILA Members access to the same data at the same time – and the authority can continue to harmonize systems from that start point. • Enterprise system: o Member Terminal and common App platforms; o Cell Phone Based Employee and customer system; and o Adoption of supportive tools and systems (based on data security, compatibility, connectivity, uniformity, and transparency).	Medium/Medium-Term

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ORGANICS MANAGEMENT STRATEGIES		
Recommended Element	**Strategies and Tactics**	**Priority/Time Frame**
Guidance to all ILA Member to specify clean yard trash separation requirements and delivery to either a specified public or private processing facility for processing.	• Organize a clean source separated yard trash stream for potential processing through initial minimum collection requirements for preferred mulching. • Establish go-forward committee for Organics implementation and timeline for actions.	High/Short-Term
Develop requirements and regulatory underpinnings for Yard Trash processing for commercial waste haulers, ILA Member projects where clean land debris is generated, homeowner associations, etc.	• Review Procurement practices and laws. • Review best practice regulatory structures in the state. • Develop Authority wide statutory requirements for clean yard trash and newly separated food waste programs and move towards adoption. • Develop model contract language for implementation including guidance of yard trash destinations for processing (public or private).	High/Short-Term
Develop Procurement Program to catalog qualifications, capabilities, technologies and specifications for private sector and public sector solutions which make the most economic sense while meeting goals of the Authority.	• Begin procurement research on organics recovery from solid waste through RFIs and RFQs. • Expand to processing options within or outside the County which include Authority Certification. • Begin qualification process for advanced food waste/clean organics processing options. • Begin procurement research on Biochar volume/mass reduction. • Begin procurement research on advanced mixed organics processing.	High/Short- to Medium-Term
Work with ILA Members and Authority committees on separated food waste options for collections; first, on a demonstration basis within participating jurisdictions, then more broadly.	• Research and present findings on successful case studies for both residential and commercial food waste programs, including costs, actual diversion outcomes and issues (i.e., loss of BTUs for WTE, container odor, vermin). • RFI on private provider food waste capabilities for collection (TBD with cooperation ILA Members utilizing a uniform approach) and processing capabilities leading to potential scoping of private services. • RFI on equipment provider technologies available and recovery guarantees leading to RFQ and potential equipment bundles should the Authority seek to build out this capacity.	Medium/Medium-Term

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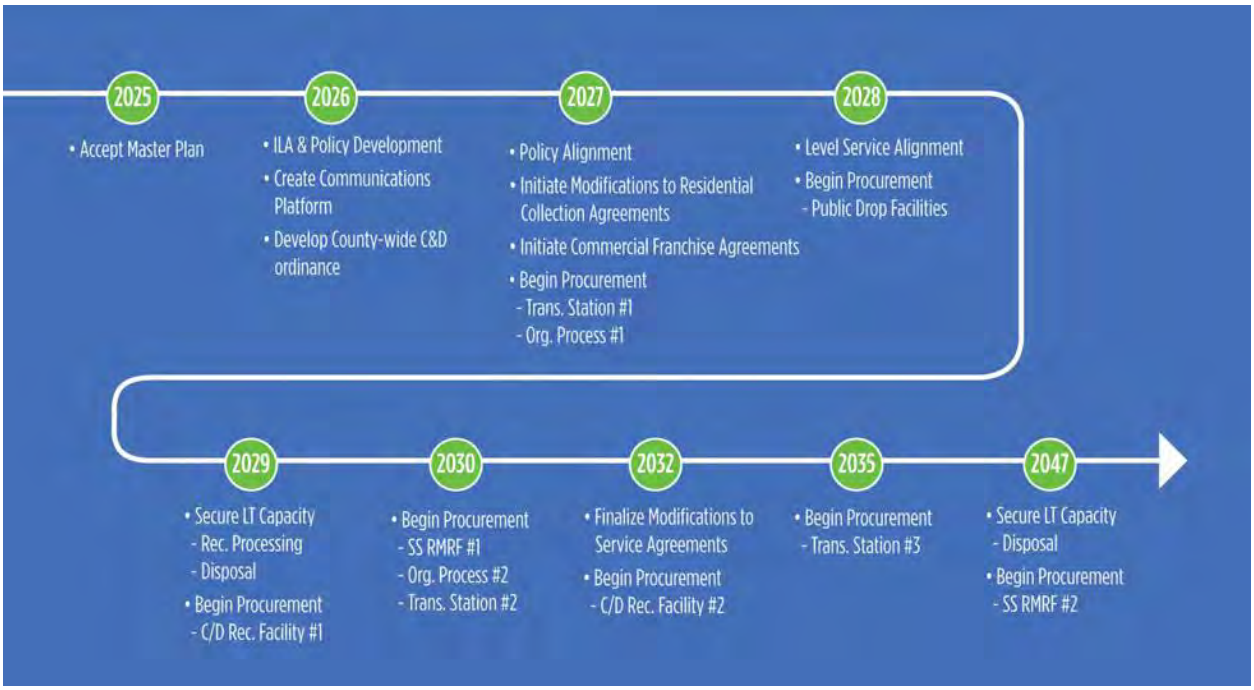
16.0 IMPLEMENTATION PLAN AND TIMELINE

This Master Plan serves as the strategic roadmap for the Authority to realize its goals, including developing an integrated and sustainable System that will enable the Authority to meet or exceed the State's 75% recycling goal. Achieving the 75% recycling goal will be challenging and will require long-term commitment and funding to continuously educate the public about consumption practices, waste generation, consequences of today's continued disposal practices, trade-offs in taxes and fees, and lifestyle choices to change the well-established habits of a culture of throwaway conveniences.

The Task 7 White Paper (attached as **Appendix Q**) details the implementation plan and timeline. It is based on the analyses and research conducted during the development of the previous White Papers, and on the many years of solid waste experience of the SCS Team. The implementation plan is graphically reflected in **Figure 15** below, and it represents a practical and feasible roadmap for developing the policies and recommendations, programs, and facilities to achieve the goals of the Authority and control its solid waste management destiny while achieving best value for the ILA Members.

Figure 15. Implementation Plan Timeline



Appendix A

Solid Waste and Recyclable Materials Processing Authority of Broward County, Florida Interlocal Agreement

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Interlocal Agreement For Solid Waste Disposal And Recyclable Materials Processing Authority of Broward County, Florida

File No. 5942.001

INTERLOCAL AGREEMENT FOR SOLID WASTE DISPOSAL AND RECYCLABLE MATERIALS PROCESSING AUTHORITY OF BROWARD COUNTY, FLORIDA

This Agreement ("Agreement") is among Broward County, a political subdivision of the State of Florida ("County"), and the municipalities in Broward County that formally approve this Agreement pursuant to its terms and return an executed signature page (each, individually, a "Municipal Party" and collectively, the "Municipal Parties") (collectively, the "Parties" and each individually a "Party").

ARTICLE 1. RECITALS AND FINDINGS OF FACT

1.1. Mission Statement. To protect the long-term public health, safety, and welfare of the residents of the Municipal Parties and County, the Parties commit to working together collaboratively through the creation of an independent legal entity known as the "Solid Waste Disposal and Recyclable Materials Processing Authority of Broward County, Florida" (the "Authority"), the purpose of which is to develop and implement a long-term, environmentally sustainable, transparent, innovative, and economically efficient plan and approach to disposal, reduction, recycling, and reuse of waste generated in Broward County.

1.2. Goals of the Authority. The Authority will (a) encourage recycling, reduction, and reuse, in order to divert Authority Solid Waste (defined below) from landfills, seeking to ultimately reach zero waste, (b) support regional solutions with other counties with priority being given to the needs and goals of the Parties, (c) conduct comprehensive public education campaigns, and (d) engage in and/or support research and development into disposal, reduction, recycling, reuse, and utilization of the latest technology to create a sustainable and resilient Authority Solid Waste disposal and Recyclable Materials (defined below) processing system. In connection with these goals, the Authority should consider and evaluate all existing permitted facilities and properties within Broward County with the appropriate entitlements and land uses, seeking to ultimately reach zero waste in order to meet its goals and objectives. The Authority may offer the Parties collection and hauling services for Authority Solid Waste and Recyclable Materials; however, ultimate responsibility for providing such services shall remain with each local government in Broward County.

1.3. Reservation of Powers. The Parties, individually and collectively, find that no municipal or County powers or functions are being transferred by this Agreement or by the creation of the Authority as a separate legal entity as described in Section 163.01, Florida Statutes. Each Party retains ultimate responsibility within its jurisdiction for supervising waste and recycling as provided by applicable law. Consequently, the Parties find that the Authority serves a limited government function: to operate the System (defined below). The Parties further find that the Authority is not a mere instrumentality of County or of the Municipal Parties. Except for such matters expressly stated in this Agreement, neither County nor the Municipal Parties shall maintain operational control hindering the Authority's status as an independent and separate legal entity.

1.4. Other Critical Operations Not Addressed by this Agreement. The continuation of this Agreement is contingent on (a) a Master Plan (defined below) being ratified by the Authority, and (b) approval of an amendment to this Agreement by the Parties, both as detailed below. The purpose of the Master Plan and the contemplated amendment to this Agreement is to: (a) provide further specificity regarding the Authority's operations that the Parties have elected to address after the Effective Date (defined below), and (b) resolve other critical issues related to the Authority's creation and reflect such consensus as may exist or be formed concerning operations and related responsibilities, liabilities, or other commitments once the Parties determine the precise operations that will be undertaken, and facilities that will be owned, by the Authority.

ARTICLE 2. DEFINITIONS

2.1. **Authority Solid Waste** means garbage, rubbish, trash, refuse, or other discarded material resulting from the operation of residential, commercial, governmental, or institutional establishments in Broward County that would normally be collected, processed, and disposed of through a public or private solid waste management service. Unless excluded by the Master Plan, this term includes tropical storm debris, hurricane debris, all other storm debris, yard waste, bulk trash, white goods (including, without limitation, large household appliances, refrigerators, stoves, washing machines, drying machines, microwave ovens, and water heaters), manure, and construction and demolition debris. The term does not include the following: solid waste from industrial, agricultural, or mining operations (other than construction and demolition debris); sludges; solids or dissolved materials in domestic sewage, or other significant pollutants in water resources, including, without limitation, silt, dissolved or suspended solids in industrial wastewater effluents, or dissolved materials in irrigation return flows; any nuclear source or byproduct materials regulated under Chapter 404, Florida Statutes, or under the Federal Atomic Energy Act of 1954, as amended; Recovered Materials (defined below); Hazardous Materials (defined below); or any waste deemed unacceptable in the Master Plan.

2.2. **Broward Tonnage** means the total amount of System Waste (defined below) generated in each Municipal Party's jurisdiction and in the unincorporated areas of Broward County. When accurate data for System Waste is not available, the Governing Board (defined below) may by majority vote elect to approximate the total amount of System Waste by using population figures based on the most recent Bureau of Economic and Business Research – University of Florida report or any other reasonable source of population data it deems appropriate.

2.3. **Executive Committee** means the body described in Section 6.3, composed of members of the Governing Board and granted the powers described in Section 8.3.

2.4. **Governing Board** means the primary governing body of the Authority as described in Section 6.2 and granted the powers described in Sections 8.1 and 8.2.

2.5. **Hauler** means a person or entity engaged in the collection, transportation, or delivery of System Waste pursuant to an agreement with, or authorization granted by, any Party or the Authority.

2.6. **Hazardous Materials** means any waste, debris, substance, constituent, object, or material that: (a) is determined to be hazardous, toxic, corrosive, reactive, ignitable, explosive, radioactive, infectious, carcinogenic, teratogenic, or mutagenic (collectively, "Hazardous"), pursuant to the Broward County Charter, Chapter 27 of the Broward County Code of Ordinances, Florida Statutes Chapter 403, Chapter 62-730 of the Florida Administrative Code, the Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C. § 6901, et seq., the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. § 9601, et seq., the Toxic Substances Control Act, 15 U.S.C. § 2601, et seq., 40 C.F.R. Parts 239 through 374, 40 C.F.R. Parts 700 through 799, 49 C.F.R. § 172.101, or any rule or regulation promulgated pursuant to the foregoing authorities; (b) is classified as "universal waste" pursuant to 40 C.F.R. Part 273; (c) is otherwise prohibited or determined to be Hazardous by applicable state or federal law; (d) is determined to be Hazardous at any time by the United States Environmental Protection Agency; (e) may cause damage to an Authority Solid Waste, Recyclable Materials, or Recovered Materials facility accepting the Hazardous Materials; or (f) otherwise poses a threat to public health or safety.

2.7. **Master Plan** means the master plan of operations document required to be adopted by the Authority for strategic and operational planning purposes, as well as describing the Authority's operations in detail and providing the comprehensive planning framework and strategic direction to manage System Waste, across Broward County, consistent with the Parties' responsibilities under applicable law.

2.8. **Recovered Materials** means metal, paper, glass, plastic, textile, or rubber materials that have known recycling potential, can be feasibly recycled, and have been diverted and source separated or have been removed from the solid waste stream for sale, use, or reuse as raw materials, whether or not the materials require subsequent processing or separation from each other, but the term does not include materials destined for any use that constitutes disposal. Recovered Materials, as described in this Agreement, are not included within the definition of Authority Solid Waste.

2.9. **Recyclable Materials** means those materials that are capable of being recycled and that would otherwise be processed or disposed of as Authority Solid Waste.

2.10. **System** means the collective arrangement of infrastructure and facilities overseen, owned, operated, acquired, or contracted for by the Authority and provided for in the Master Plan to manage System Waste.

2.11. **System Waste** means Authority Solid Waste, Recovered Materials, and Recyclable Materials, collectively, generated in any of the Parties' jurisdictions and/or from outside of Broward County and identified as acceptable waste to be accepted by the Authority in the Master Plan. This term does not include Hazardous Materials or any waste deemed unacceptable in the Master Plan.

ARTICLE 3. FORMATION

3.1. By this Agreement, the Parties are coordinating a joint management program for System Waste through the Authority, created as an independent and separate legal entity pursuant to, and consistent with, Sections 163.01, 403.706(11), (12), (15), and (19), and 403.713, Florida Statutes.

3.2. The Authority will have the power and duty to establish, operate, and maintain the System. This Agreement does not divest any Party of its ultimate authority or obligation to supervise the provision of services related to System Waste generated in its jurisdiction; none of the powers granted the Authority constitutes a transfer of powers or functions as addressed under Article VIII, Section 4, of the Florida Constitution.

3.3. Deadline to Adopt Initial Master Plan and Facilities Amendment. The Authority, through its Governing Board, must: (a) adopt a Master Plan pursuant to the requirements of Article 7, and (b) approve a proposed amendment to this Agreement (the "Facilities Amendment") that must subsequently be adopted by the Parties and that meets the procedural and substantive requirements of this section (the requirements under both subparts (a) and (b) are collectively "Formation Conditions"). If the Formation Conditions are not met within eighteen (18) months, plus any extension(s) of time approved pursuant to Section 3.3.1, after the Effective Date, this Agreement automatically terminates, and upon such automatic termination the Parties will only owe such duties to one another as expressly survive termination of this Agreement.

3.3.1. Extension. The Executive Committee may, by majority vote, extend the deadline to meet the Formation Conditions for up to an additional aggregate total of six (6) months. If the Executive Committee does not extend or has no further extension of the deadline available to it, the Governing Board may, by majority vote, extend the deadline by up to an additional twelve (12) months (i.e., beyond the six (6) month extension exercisable by the Executive Committee). In no circumstance will the deadline to meet the Formation Conditions, as extended, be more than thirty-six (36) months after the Effective Date.

3.3.2. Withdrawal. If and after the Governing Board approves the Facilities Amendment, the Authority shall provide written notice to each Municipal Party and to County. After receiving the Authority's notice, each Municipal Party's elected body shall have one hundred twenty (120) days to adopt a resolution approving the Facilities Amendment. A Municipal Party's failure to deliver to the Authority a resolution adopted by its elected body approving the Facilities Amendment within the one hundred twenty (120) day period will be deemed that Party's withdrawal from this Agreement. Except for provisions that survive expiration or termination of this Agreement, a Party that withdraws from this Agreement pursuant to this section will have no further rights, duties, or obligations hereunder, including, without limitation, that such Party will not have any representative on the Governing Board or the Executive Committee. Notwithstanding the foregoing, any Party that withdraws pursuant to this section will not be prevented from rejoining at a later date pursuant to Section 5.2.

3.3.3. Facilities Amendment; Required Contents. The Facilities Amendment must provide for the following:

3.3.3.1. A procedure and terms by which County may utilize facilities operated as part of the System (if any) that the Authority may own relating to the disposal of Authority Solid Waste if: (a) the Authority is no longer using the facility or has substantially reduced usage of the facility, resulting in a reduction of disposal capacity in Broward County, (b) such capacity is deemed necessary by County to fulfill its obligations under Section 403.706(1), Florida Statutes, and (c) County intends to operate such facility; and

3.3.3.2. A process to effectuate the orderly transfer of services being performed by the Authority and the transfer of assets of the Authority to a successor entity, or to County if County chooses to perform those services, if this Agreement is terminated or expires or if the Authority is dissolved (collectively "Wind Down"), including detailed processes addressing:

3.3.3.2.1. The disposition and/or transfer of reserve funds collected by the Authority associated with the assets being transferred;

3.3.3.2.2. How liabilities of the Authority, including debt obligations associated with assets being transferred, will be satisfied;

3.3.3.2.3. Whether or how County may acquire assets of the Authority that County intends to continue operating on behalf of the residents of Broward County related to Authority Solid Waste; and

3.3.3.2.4. How the costs of a capital expansion for County-owned facilities will be allocated among the Parties (which may include, among other things, County paying the full cost, the Municipal Parties paying the full cost, or some sharing of costs between County and the Municipal Parties).

3.3.4. Notwithstanding anything in this Agreement to the contrary, including, without limitation, Article 16, for the Facilities Amendment to be effective, it must be approved by the elected bodies of: (a) Municipal Parties representing at least eighty percent (80%) of the total population of the Municipal Parties; and (b) County. The Facilities Amendment must be adopted by the elected bodies of the Parties described in this section for the Formation Conditions to be met.

3.3.5. Condition on Exercise of Powers. Until the Formation Conditions are fully met, the Authority may not exercise any of the powers granted in the following sections of this Agreement:

3.3.5.1. Section 8.1.3 (Establishment of rates, fees, and other charges);

3.3.5.2. Section 8.1.4 (Recyclable Materials and Recovered Materials processing);

3.3.5.3. Section 8.1.5 (Recyclable Materials and Recovered Materials facilities and programs);

3.3.5.4. Section 8.1.7 (Collection and transportation services);

3.3.5.5. Section 8.1.8 (Authority Solid Waste disposal);

3.3.5.6. Section 8.1.12 (Issuance of bonds);

3.3.5.7. Section 11.1 (Commitment of System Waste); or

3.3.5.8. Section 11.2 (Regulatory Flow Control).

ARTICLE 4. DURATION

4.1. Effective Date and Initial Term. This Agreement will be effective on the first business day after it has been executed by: (a) Municipal Parties representing at least seventy-five percent (75%) of the population of Broward County; and (b) County ("Effective Date"). This Agreement begins on the Effective Date and continues for a period that ends forty (40) years after the Effective Date ("Initial Term"). Subject to Articles 3 and 17, no Party may terminate or otherwise withdraw from this Agreement during the Initial Term.

4.2. Extension Terms. This Agreement may be extended for up to two (2) consecutive ten (10) year terms (each an "Extension Term," and together with the Initial Term, the "Term") by the approval of the Parties' elected bodies as set forth below:

4.2.1. No later than five (5) years before the end of the then-current term, the Governing Board must determine, based on the projected funding needs of the Authority, the percentage of Broward Tonnage and number of Municipal Parties necessary to extend this Agreement. Notwithstanding the foregoing, no Extension Term may be exercised unless the elected bodies of Municipal Parties representing at least fifty percent (50%) of the Broward Tonnage and the elected body of County agree to exercise the Extension Term.

4.2.2. Except for the provisions of this Agreement that survive termination of this Agreement or that survive a Party's withdrawal from this Agreement, only those Parties whose elected bodies approve an Extension Term will be bound to this Agreement during such Extension Term.

4.2.3. If the Parties fail to extend this Agreement pursuant to Section 4.2.1, this Agreement will expire at the end of the then-current Term.

ARTICLE 5. MEMBERSHIP ELIGIBILITY AND OBLIGATIONS

5.1. Eligibility for Membership. County and each municipality located within Broward County are eligible to be Parties to this Agreement and thereby be members of the Authority.

5.2. Subsequent Joinder by Municipalities. After the Effective Date, any eligible municipality that is not already a Party may become a Party by agreeing to this Agreement (as may subsequently be amended), the Master Plan, and any additional terms and conditions established by the Authority, including, without limitation, payment of all amounts as may be required by the Governing Board.

5.3. Dissolution or Merger of Municipal Parties. Any Municipal Party that becomes unincorporated will lose its representative on the Governing Board. The tonnage attributed to any such former Municipal Party will be transferred to County for the purposes of calculating Broward Tonnage in relation to voting. Municipal Parties that merge will retain only a single representative on the Governing Board and the tonnage attributed to the merged Municipal Party will be the combined tonnage of the merging Municipal Parties for the purposes of calculating Broward Tonnage in relation to voting.

5.4. Ongoing Contributions of Parties Prior to Special Assessment. Until the Authority is able to fund its budget through special assessments or other methods, each Party must financially contribute towards the costs of operations of the Authority as stated in this section. Such expenses shall not exceed an aggregate yearly maximum amount of two million dollars ($2,000,000), calculated on a fiscal year basis (October 1 to September 30). If the Effective Date is on any date other than the start of a fiscal year, the Authority's budget for the first fiscal year shall not exceed a prorated amount of the maximum provided for in this section. The Authority will invoice each Party that Party's yearly funding obligation, on a quarterly or other basis as determined by the Authority, payable in advance.

5.4.1. Consultant Expenses. County will be responsible for payment to the Authority for fifty percent (50%) of the costs of professional/technical consultants retained by the Authority for the development of the Master Plan, with the remaining fifty percent (50%) of such costs paid by the Municipal Parties on a pro rata basis based on population.

5.4.2. Other Authority Expenses. Other than the division of expenses set forth in Section 5.4.1, each Party will jointly fund all other Authority expenses on a pro rata basis based on population (for County, the unincorporated area).

5.5. System Waste Segregation Programs. After the effective date of the applicable minimum standards in any policy or program established by the Authority, the Parties must not enact or permit to continue any program for segregating new or used materials at the point of generation for reuse or recycling that fails to meet the minimum standards in the policy or program established by the Authority, unless expressly excepted by the Authority.

5.6. Cooperation. Each Party agrees to cooperate in good faith with the Authority and to deliver such further information and to take such other actions as may be reasonably requested by the Authority to carry out the intent and purposes of this Agreement, including, without limitation:

5.6.1. Providing Hauler information, including, without limitation: Hauler name and address; make, body type, and motor vehicle registration number of each vehicle used; area of collection; status as municipal vehicle operator or contract hauler; and data received pursuant to Section 11.4;

5.6.2. Adopting such regulations, executing such agreements, providing such information, and doing such work as may be required by any federal, state, or local agency as part of any application for financial assistance; and

5.6.3. Performing such other acts as may be reasonably required by the Authority in furtherance of its operation of the System.

The Authority must pay all reasonable out-of-pocket costs associated with this Section 5.6.

ARTICLE 6. GOVERNANCE

6.1. The Authority will be overseen and managed by a Governing Board, Executive Committee, and Executive Director (described below), which are hereby established and have the powers and authority as set forth herein.

6.2. Governing Board.

6.2.1. Membership. Each Party must appoint one (1) of its elected officials to serve as a member of the Governing Board, which appointee serves at the pleasure of the appointing Party. The appointment by each Party will be made according to such rules and procedures as may be adopted by the appointing Party. Should a representative on the Governing Board cease to be a duly qualified elected official of the appointing Party or have more than two (2) consecutive absences from meetings of the Governing Board that are not excused (by majority vote of the Governing Board or pursuant to adopted policy), the appointing Party must promptly appoint a replacement member that meets the foregoing requirements.

6.2.2. Meetings. The Governing Board must meet at least twice per fiscal year of the Authority, at such dates and times as determined by the Chair of the Governing Board, to conduct the business of the Authority.

6.2.3. Alternate Members. Each Party must appoint one (1) of its elected officials as an alternate member to serve on the Governing Board in the absence of that Party's primary appointed member. An alternate member may only vote when the primary member of the Governing Board for that Party is absent from the meeting. Alternate members may attend and participate during discussion in all Governing Board meetings.

6.2.4. Approvals. Subject to Sections 6.8 and 7.1, the Governing Board may take official action only if: there is a quorum; the action is supported by an affirmative vote of a majority of the representatives present that are eligible to vote; and the action is also supported by the affirmative vote of members representing a majority of the Broward

Tonnage. Alternate members of the Governing Board will count towards quorum only when they are serving as voting members.

6.3. Executive Committee.

6.3.1. Membership. An Executive Committee is to be established, composed of eleven (11) members of the Governing Board as follows:

6.3.1.1. The County's Governing Board Member.

6.3.1.2. Ten (10) Governing Board members from Municipal Parties, who will be selected as follows:

6.3.1.2.1. Large Municipalities. Five (5) members representing the largest third (1/3) of Municipal Parties by population, selected by majority vote of the members of the Governing Board representing those Municipal Parties.

6.3.1.2.2. Medium Municipalities. Three (3) members representing the middle third (1/3) of Municipal Parties by population, selected by majority vote of the members of the Governing Board representing those Municipal Parties.

6.3.1.2.3. Small Municipalities. Two (2) members representing the smallest third (1/3) of Municipal Parties by population, selected by majority vote of the members of the Governing Board representing those Municipal Parties.

6.3.1.2.4. If the number of Municipal Parties is not evenly divisible by three (3), then: (a) if there is a single additional Municipal Party, it will be placed in the Small Municipalities group, or (b) if there are two (2) additional Municipal Parties, the larger one (1) will be placed in the Medium Municipalities group and the other one (1) will be placed in the Small Municipalities group.

6.3.1.3. Population figures to assign Municipal Parties into each of the categories for purposes of selecting members of the Executive Committee will be based on the most recent Bureau of Economic and Business Research – University of Florida report, with such assignments adjusted on January 1, 2030, and every ten (10) years thereafter, and at the conclusion of each two (2) year term if any municipality joined this Agreement during the interim.

6.3.1.4. Terms of Service on Executive Committee. Executive Committee members serve a two (2) year term. Should a member of the Executive Committee cease to be a member of the Governing Board, a successor must be selected using

the same procedures as provided in Section 6.3.1, which successor will serve for the remaining term of the original appointment.

6.3.1.5. Members of the Executive Committee representing groups of Municipal Parties may be removed at any time by majority vote of the applicable portion of the Governing Board (e.g., Large Municipalities, Medium Municipalities, or Small Municipalities, as applicable) that selected them.

6.3.1.6. Any decision of the Executive Committee may be overturned by an affirmative vote of: (a) at least two-thirds (2/3) of the members of the Governing Board representing Municipal Parties; and (b) the County's representative on the Governing Board. If the initial vote of the Governing Board in favor of overturning an Executive Committee decision consists of Governing Board members representing at least ninety (90%) of the population of the Municipal Parties present at the time of the vote, but did not include the County's representative in favor of overturning such decision, then a second vote will be taken; if the second vote is a unanimous vote of the Municipal Parties' representatives to the Governing Board present that voted in the initial vote, the Executive Committee decision will be overturned regardless of the County representative's vote. Notwithstanding the foregoing, the Governing Board may not overturn any decision of the Executive Committee concerning the appointment, removal, or compensation of the Executive Director.

6.3.2. Alternate Members.

6.3.2.1. There must be one (1) alternate member from each of the three (3) municipal categories, selected in the same manner as the primary members. There must be one (1) alternate member from County, who shall be the County's alternate member of the Governing Board.

6.3.2.2. Alternate members may only vote when a primary member of the Executive Committee in the applicable category is absent from the meeting. Alternate members may attend and participate during discussion in all meetings.

6.3.2.3. Alternate members will count towards quorum only when they are serving as voting members.

6.3.3. Meetings. The Executive Committee will meet regularly at such dates and times as may be necessary to conduct the business of the Authority. Meetings may be scheduled by the Executive Committee and pursuant to such rules of procedure as may be adopted by the Executive Committee; such rules will include a process for the Executive Director to request a meeting. Minutes of each meeting of the Executive Committee shall be distributed to all Governing Board members upon approval of such minutes by the Executive Committee.

6.3.4. Approvals. Except as specifically provided in this Agreement, approval of an action or recommendation will require a quorum and a majority vote of its members present at a meeting and eligible to vote.

6.4. Technical Advisory Committee. A Technical Advisory Committee ("TAC") is established and will be composed of representatives from each Party. The role of the TAC, and any TAC subcommittee established by the TAC, is to provide technical advice, guidance, recommendations, and counsel to the Governing Board, Executive Committee, and/or Executive Director on technical matters relevant to the System, including environmental issues and educational programs, and to provide a forum for the exchange of ideas among Party representatives, the public, and the private sector. The Executive Committee shall determine appropriate staffing for the TAC.

6.4.1. Membership. Each Party may appoint a representative with technical or professional knowledge and/or experience in the solid waste industry, environmental sciences, sustainability, or another related profession, to the TAC from that Party's solid waste, environmental management, public works, utilities, or similar department or organizational division. In addition to the regular TAC representative, each Party may also designate a similarly qualified alternate representative. Alternate representatives may attend and participate in the TAC meetings or TAC subcommittee meetings but may only be counted toward a quorum or vote in the absence of the appointed representative for which they serve as alternate. TAC representatives and alternates will serve at the pleasure of their appointing Party.

6.4.2. Meetings. Regular meetings of the TAC will be held in accordance with a schedule approved by the TAC, or as directed by the Governing Board, Executive Committee, or Executive Director.

6.4.3. Approvals. Except as specifically provided in this Agreement, action by the TAC will require a quorum and approval by a majority of the representatives present at the meeting and eligible to vote.

6.5. Meeting Procedure. The following procedures apply to the Governing Board, the Executive Committee, and the TAC:

6.5.1. Quorum. A quorum will be a majority of the total voting members, provided that the members comprising the quorum must represent at least one-half (1/2) of the Broward Tonnage. Unless otherwise authorized by the Governing Board, the Executive Committee, or the TAC, as applicable, a quorum is determined on the basis of physical attendance. If there is a quorum, all members may vote regardless of whether they are attending the meeting physically or via remote conferencing technology.

6.5.2. Chair and Vice-Chair. On an annual basis, the membership of each body must select from among its members a Chair and a Vice-Chair; the Vice-Chair will serve as the Chair when the Chair is not present.

6.5.3. Rules of Procedure. Each body may adopt rules of procedure to conduct its business. In the absence of any specifically adopted rules, the body will use Robert's Rules of Order; provided, however, if there is a conflict between this Agreement and Robert's Rules of Order, this Agreement governs.

6.5.4. Meetings Open to the Public. Meetings of the Governing Board, Executive Committee, and TAC shall be open to the public in accordance with Florida's Government-in-the-Sunshine Law, Section 286.011, Florida Statutes, excluding meetings that are statutorily exempt pursuant to applicable law.

6.6. Ethics and Required Abstentions.

6.6.1. Ethics Compliance. In their roles with the Authority, each member of the Governing Board and the Executive Committee will be treated as "Covered Individuals" within the meaning of Section 1-19 of the Broward County Code of Ordinances and must comply with all state and County laws and requirements pertaining to conflicts of interest, ethics, and lobbying. For purposes of the prohibition on lobbying under Section 1-19(c)(2) of the Broward County Code of Ordinances, the Executive Director and TAC will also be treated as "Covered Individuals." The Governing Board may adopt additional requirements for itself, the Executive Director, the Executive Committee, the TAC, and any employees of the Authority.

6.6.2. No member of the Governing Board or Executive Committee will participate in discussion or vote on any item that relates to an agreement or contract in which the member's respective appointing body (i.e., Municipal Party or County) is a party. This provision is limited only to agreements or contracts with four (4) or fewer Parties, applies only to meetings of the Governing Board or Executive Committee, and does not prohibit the recused member from voting on the agreement or contract when such agreement or contract comes before their Party's elected body.

6.7. Executive Director.

6.7.1. The role of Executive Director is hereby established with such specific duties and responsibilities as described in Section 8.4.

6.7.2. The Executive Director must be an employee of the Authority and while serving as Executive Director, must not be: (a) employed by any Party; (b) serving on the elected body of any Party; or (c) contracted to consult for or lobby on behalf of any Party.

6.7.3. The Executive Committee may appoint or remove the Executive Director by majority vote.

6.8. Major Decisions. Notwithstanding anything to the contrary in this Agreement, the Authority may not take any of the following actions without the approval of at least: (a) two-

thirds (2/3) of the representatives of the Governing Board voting; and (b) representatives of the Governing Board voting that account for two-thirds (2/3) of the Broward Tonnage:

6.8.1. The sale, distribution, or transfer of any real property interest with a value of more than two million dollars ($2,000,000);

6.8.2. The issuance of bonds or the approval of a bank loan with a value of more than two million dollars ($2,000,000);

6.8.3. The recommendation to remove the Executive Director, subject to Executive Committee approval;

6.8.4. Approval of any and all special assessments;

6.8.5. The initiation or settlement of any legal action with an estimated value of more than two million dollars ($2,000,000); or

6.8.6. Assignment by the Authority of any of its rights or obligations under this Agreement.

6.9. Distribution of Authority Cash or Property; Surplus Authority Funds. Except as otherwise provided in this section, and notwithstanding any other section of this Agreement, the Authority is prohibited from distributing any cash or property to any Party or Parties except upon Wind Down or to reimburse the Parties for contributions made to the Authority pursuant to Section 5.4., and then, only if: (a) upon Wind Down, the Auditor (defined below) issues a written opinion that such distribution will not impact any closure, perpetual maintenance, or other obligations that may exist after expiration or earlier termination of this Agreement; and (b) such distribution is fair and equitable between the Parties. In all other circumstances, if the Authority has surplus funds or property not needed for ongoing operations of the System or for future closure, maintenance, and reserve obligations, it may only be utilized for System-related purposes, including but not limited to reserving for future System improvements or obligations, maintenance, repairs, or expansion; to provide credits against or reductions to future assessments, tipping fees, or other user fees; or to enhance recycling and materials reuse programs or education. The prohibitions in this section do not apply to contracts for fair or adequate consideration between the Authority and one or more Parties or have any impact with regard to the property known as Alpha 250.

6.10. Legal Counsel.

6.10.1. Authority Counsel. Authority Counsel shall act as the general counsel and advisor to the Authority, including counsel to the Governing Board and the Executive Committee. Authority Counsel will have such duties as authorized by the Governing Board and serve at the pleasure of same. Authority Counsel shall not be an: (a) elected official of any Party, or (b) employee of any Party other than the Authority. Authority Counsel shall be an attorney duly licensed to practice law in the State of Florida, shall be in good standing

with the Florida Bar, and shall at all times comply with all applicable rules of the Florida Bar regulating attorney conduct. Authority Counsel shall have substantial experience providing counsel to a governmental entity or governmental entities within the State of Florida and demonstrated familiarity with issues related to solid waste disposal and recycling. Except for the matters described in Section 6.10.2, Authority Counsel may retain special counsel to provide legal services to the Authority in connection with particular legal matters or in the event of actual or perceived legal conflict, subject to the approval of the Executive Committee.

6.10.2. Independent Counsel; Scope of Services and Procedures for Retention.

6.10.2.1. The Parties recognize there are certain Sensitive Issues (defined below) where Parties may have conflicting interests, and as to which Authority Counsel may have an actual or perceived conflict of interest or bias.

6.10.2.2. The "Sensitive Issues" are: (a) whether a specific action of the Authority requires the vote of a Party's (or Parties') elected body or Governing Board member; (b) whether a proposed action by the Governing Board or Executive Committee requires an amendment to the Master Plan; (c) whether a proposed amendment to the Master Plan constitutes a Significant Amendment as defined in Section 7.1.2.1; (d) whether a proposed action by the Governing Board or Executive Committee should be treated as an amendment to the Master Plan that requires a Party's (or Parties') Governing Board member's consent pursuant to Section 7.1.3; or (e) whether a proposed action by the Governing Board or Executive Committee must be made through an amendment to the Agreement that requires a Party's (or Parties') elected body's approval pursuant to Section 16.1.5.

6.10.2.3. Before the Authority may exercise any of its powers under Sections 8.1.1 through 8.1.12 and before the Governing Board or Executive Committee may exercise any related powers, the Authority must adopt, by unanimous vote of the Executive Committee, procedures relating to the retention, scope of work, qualifications of, compensation for, and effect of opinions of independent outside counsel, to address situations where the general counsel for a Party issues a written opinion that the opinion of Authority Counsel on a Sensitive Issue is legally incorrect ("Independent Counsel Procedures").

6.10.2.4. Adoption of the Independent Counsel Procedures and any subsequent amendments thereto require a unanimous vote of the Executive Committee. The initial proposed Independent Counsel Procedures will be developed by the municipal and County attorneys that serve as co-counsel to the Solid Waste Working Group established by the "Memorandum of Understanding Regarding Collaborative Study and Subsequent Development of an Integrated Solid Waste and Recycling System" between Broward County municipalities and

County with an effective date of October 1, 2019 (namely, Jamie Cole, Esq. with Weiss Serota Helfman Cole + Bierman, PL, Michael Cirullo, Esq. with Goren Cherof Doody & Ezrol, PA, and the County Attorney, collectively, "SWWG Co-Counsel"), and may only be submitted for consideration to the Executive Committee after separate and independent written approval of the draft proposed procedures is issued by each of the SWWG Co-Counsel. Proposed amendments to the Independent Counsel Procedures may only be considered by the Executive Committee after separate and independent written approval of the proposed amendment is issued by (a) counsel designated by the municipal members of the Executive Committee, and (b) the County Attorney.

6.10.2.5. Nothing in this section shall be deemed a condition precedent to, and shall not prevent or inhibit, any Party's right to invoke the separate dispute resolution provisions pursuant to Article 17.

ARTICLE 7. OBLIGATIONS OF THE AUTHORITY AND MASTER PLAN

7.1. Master Plan. The Authority must adopt a Master Plan that describes, among other things, the operations of the Authority in sufficient detail to fund and implement the System and any related facilities or programs and to allow the Authority to plan for financing, investments, and improvements related to the System.

7.1.1. Contents. A Master Plan must provide for, at a minimum, the following:

7.1.1.1. Revenues necessary to operate the Authority, including the amount of, and methodology to calculate, reserve funds needed to cover any and all applicable costs for closure, long-term care, perpetual maintenance, and potential remediation related to the System and its components;

7.1.1.2. Storage, separation, processing, recycling, recovery, reuse, and identification of the number of diversion sites and disposal sites for System Waste needed for System operations, as may be appropriate;

7.1.1.3. Diversion plans for: (a) any Hazardous Materials that have impermissibly entered the System; and (b) any System Waste for which diversion is appropriate under applicable law;

7.1.1.4. Strategies, services, and programs to address Authority Solid Waste reduction as well as Recyclable Materials and Recovered Materials processing, and appropriate public education regarding same;

7.1.1.5. Alternative and contingency facilities, consistent with this Agreement;

7.1.1.6. Whether certain disposal methods will be prohibited at Authority-owned facilities for the purposes of protecting underground sources of drinking water;

7.1.1.7. Additional goals identified by the Governing Board not inconsistent with applicable law, this Agreement, or with County's exercise of its statutorily granted powers and obligations; and

7.1.1.8. Strategies to fulfill the obligations of the Authority related to System Waste delivered to the System, consistent with the powers and limitations of this Agreement.

7.1.2. Procedure to Adopt and Amend Master Plan.

7.1.2.1. Adoption of Master Plan and Significant Amendments. A Master Plan will not be effective unless approved by: (a) members of the Governing Board representing Municipal Parties that comprise at least two-thirds (2/3) of the total population of the Municipal Parties, and (b) County's representative to the Governing Board. All proposed amendments to the Master Plan that concern any of the following (collectively, "Significant Amendments") will be subject to the same requirements for approval (set forth in the preceding sentence) as a Master Plan to be effective:

7.1.2.1.1. Addition or removal of any category of waste or material (e.g., yard waste, bulk trash, white goods, etc.) from the Authority's jurisdiction or operations;

7.1.2.1.2. Closure of any "solid waste disposal facility," as defined in Section 403.703, Florida Statutes (2022), owned or operated by the Authority;

7.1.2.1.3. County's obligations under Section 403.706(1), Florida Statutes.

7.1.2.2. Adoption of Other Amendments to Master Plan. Amendments to the Master Plan that are not Significant Amendments must be adopted by the Governing Board subject to the provisions of Section 6.2.3. If at least one third (1/3) of the Governing Board members present agree that a proposed amendment to the Master Plan constitutes a Significant Amendment, it shall be treated as a Significant Amendment and may only be adopted subject to the provisions of Section 7.1.2.1.

7.1.3. Notwithstanding anything in this Agreement to the contrary, no proposed amendment to the Master Plan that directly or indirectly (a) creates any additional liability or obligation of any Party, (b) disproportionately removes a right of any Party, or (c) has a disproportionate adverse effect on any Party, will be effective without the affirmative vote of the impacted Party's (or Parties') representative(s) on the Governing Board. In the event of a conflict between the Master Plan and this Agreement, this Agreement will prevail.

7.2. Obligation to Perform. The Authority must implement the various material strategies, services, programs, and goals described in the adopted Master Plan, as may be amended.

7.3. Obligation to Direct the Flow of System Waste. The Authority is obligated to accept all System Waste committed by the Parties, pursuant to Section 11.1, and must cause such System Waste to be directed from the designated System receiving facilities and delivered to appropriate sites for processing or disposal in compliance with the Master Plan and applicable law.

7.4. Obligation to Maintain Reserves. The Authority must ensure adequate reserve funds are collected and maintained to cover applicable costs for closure, long-term care, perpetual maintenance, and potential environmental and other remediation related to the System. The amount of reserve funds and methodology to calculate same must be included in the Master Plan.

ARTICLE 8. POWERS OF THE AUTHORITY

8.1. The Authority has the following general powers, which are granted to the Governing Board unless otherwise expressly provided for in this Agreement:

8.1.1. Develop, adopt, and implement a Master Plan consistent with the powers of the Authority and consistent with the terms and conditions stated in this Agreement.

8.1.2. Develop an annual revenue and expense budget for each fiscal year sufficient for the operation of the Authority.

8.1.3. Establish such rates, fees, and other charges and revenue sources allowed by law, including, without limitation, special assessments and tipping fees, to sufficiently fund and operate the System, which rates, fees, and other charges must be applied uniformly to each Party and will be set at no higher an amount than is reasonably required to accomplish the authorized purposes of the Authority (including all appropriate reserves). Notwithstanding the foregoing, the Authority may establish different rates, fees, or other charges for Parties that join the Authority after the Effective Date and may provide reasonable credits against any such rates, fees, or other charges for Parties that have made extraordinary contributions of funds, real property, other assets, services, or in-kind contributions to the Authority.

8.1.4. Provide for the processing of Recyclable Materials and Recovered Materials generated in each Party's jurisdiction.

8.1.5. Develop, implement, operate, and manage facilities and programs concerning the processing of Recyclable Materials and Recovered Materials and make same available to each Party on uniform terms. Nothing herein will prevent any Party from developing, implementing, operating, or managing programs concerning the processing of Recyclable Materials or Recovered Materials that do not conflict with the minimum standards set by

the Authority. Notwithstanding the foregoing, the Authority may establish different terms for Parties that join the Authority after the Effective Date.

8.1.6. Set minimum standards for System Waste segregation or source separation programs at the point of generation or collection.

8.1.7. Operate services for the collection and transportation of System Waste or other types of waste identified in the Master Plan for collection or transport and, if the Authority chooses to operate such services, make said optional services available to each Party.

8.1.8. To the extent permissible under applicable law and provided it does not interfere with County's ability to fulfill its statutory obligations, including under Section 403.706(1), Florida Statutes, the Authority will have the power to provide disposal for Authority Solid Waste generated in the Parties' jurisdictions. The Authority is not granted the power to own or operate a "solid waste disposal facility," as that term is defined in Section 403.703, Florida Statutes (2022), or sell or otherwise transfer an interest in such a facility, unless an amendment to this Agreement, granting such power to the Authority and setting forth the limits and extent of such power, is approved by the elected bodies of: (a) Municipal Parties representing at least two-thirds (2/3) of the total population of the Municipal Parties, and (b) County.

8.1.9. Conduct studies and research on strategies to improve the management of System Waste.

8.1.10. Provide monitoring of projects, programs, and facilities that directly or indirectly affect the System.

8.1.11. Provide education, outreach, and public information programs to increase the percentage of Recyclable Materials and Recovered Materials that are successfully recycled, to promote the reduction and reuse of Authority Solid Waste in the Parties' jurisdictions, and to increase public understanding of, and engagement with, the Authority's work.

8.1.12. Issue bonds or other instruments related to short- or long-term borrowing, and letters of credit or debt that materially relates to the System.

8.1.13. Sue and be sued, implead, and be impleaded in all courts.

8.1.14. Consistent with the powers described in this Article 8, the requirements of Chapter 403, Florida Statutes, and other applicable law, the Authority will have the power to contract with governmental agencies, individuals, public or private corporations, municipalities, and any other person or entity.

8.1.15. In order to fulfill the purpose and intent of this Agreement, and except as expressly limited by this Agreement, exercise all other necessary and appropriate powers of an

independent entity created pursuant to Chapter 163, Florida Statutes, including without limitation, to acquire, at its discretion, personal or real property or any interest therein by gifts, lease, or purchase.

8.2. The Governing Board has power and authority to take the following actions:

8.2.1. Approval of annual budgets as described in Article 9.

8.2.2. Approval and levy of special assessments as described in Article 9.

8.2.3. Approval of revenue bonds.

8.2.4. Establish the aggregate maximum debt authority of the Executive Committee.

8.2.5. Purchase, sell, or lease any assets of the Authority, in any amount, subject to applicable law.

8.2.6. Enter into agreements for services in any amount, subject to applicable law.

8.2.7. Approval of the Master Plan, the Facilities Amendment, and other amendments, as described in Article 7 and subject to the terms and conditions stated in this Agreement.

8.2.8. Appoint Authority Counsel and make all decisions regarding Authority Counsel, including compensation and, as necessary, removal.

8.2.9. Approval of the annual tipping fee(s), consistent with the terms and conditions of this Agreement.

8.2.10. Approval of any fictitious name or marketing name for the Authority.

8.2.11. Approval of any Governing Board rules of procedure.

8.2.12. Approval of bylaws for the Authority, including, without limitation, the extent of the powers and authority of the Executive Committee or Executive Director to: (a) approve and execute contracts for goods, services, and real property; (b) pursue, defend, and settle legal claims or litigation; (c) enter into revolving and other debt agreements; and (d) exercise other powers of the Governing Board.

8.3. Unless provided otherwise in this Agreement, the Executive Committee has the following powers:

8.3.1. Overseeing the operation and management of the Authority.

8.3.2. Establishing surety bond requirements for the Authority's officers and employees in such amounts as it deems necessary. The premiums for the bonds will be paid by the Authority in the same manner as any other operating expense.

8.3.3. Approval of operational policies for the Authority.

8.3.4. Approval of any annual plan of operations for the Authority.

8.3.5. Develop and recommend to the Governing Board tipping fees, rates, and other charges and revenue sources to sufficiently fund the System and the operation of the Authority.

8.3.6. Develop and recommend to the Governing Board an annual budget, including hosting public workshops and other forums for public input for the annual budget.

8.3.7. Develop and recommend bylaws for the Authority to the Governing Board.

8.3.8. Enforce Flow Control Ordinances (defined below) and the flow control provisions of Hauler contracts for System Waste, as the agent for the Municipal Parties and/or for County, if provided for in such ordinances and to the extent such action is necessary to comply with the Authority's obligations under this Agreement and the service agreements.

8.3.9. Initiate the process for the issuance of revenue bonds; provided that no such revenue bonds will be issued unless approved by the Governing Board and consistent with the terms of this Agreement.

8.3.10. For special assessments, retain any consultants necessary to conduct rate and methodology studies.

8.3.11. Appointment of the Executive Director and all personnel-related decisions regarding the Executive Director, including annual reviews, compensation, and, as necessary, removal.

8.4. The Executive Director serves as the chief executive officer of the Authority, responsible for the operation of the Authority in accordance with the policies and decisions of the Governing Board and the Executive Committee, and, among such other duties as authorized by those policies and decisions, has the following specific duties and responsibilities:

8.4.1. Hire and manage a chief sustainability officer for the Authority or other such employee with similar responsibilities regardless of title.

8.4.2. Hire and manage other such employees as authorized by the Governing Board through its approval of the annual budget as being necessary for the operation of the Authority.

8.4.3. Oversee all personnel issues with employees of the Authority, including setting salaries and benefits, annual reviews, discipline, and termination.

8.4.4. Serve as registered agent for all service of process on the Authority and execute documents on the Authority's behalf as authorized by the Governing Board.

8.4.5. Provide recommendations, assistance, and support as necessary for the Governing Board's adoption of a Master Plan.

8.4.6. Provide recommendations, assistance, and support as necessary for the Executive Committee's approvals of operational policies for the Authority and the annual plan of operations for the Authority.

ARTICLE 9. REVENUE, BORROWING, AND BUDGET

9.1. Special Assessments. In accordance with the provisions of Florida law, including Chapters 163 and 197, Florida Statutes, the Parties agree and stipulate that all improved properties in the geographical areas governed by any of the Parties (for County, the unincorporated area) receive a direct, substantial benefit by the provision of System Waste disposal and processing services by the Authority. Therefore, the Authority has the power to impose, levy, and collect (directly or indirectly) special assessments as a means of: financing the construction and/or acquisition of additions, extensions, and improvements to the System and/or the payment of the principal of and interest on bonds issued pursuant to this Agreement; paying the costs of operating, maintaining, and repairing the System; and providing funds for all other payments that are required to be made by the Authority in connection with the purposes of this Agreement.

9.2. Subject to Section 6.8, the Governing Board will have the power to set rates for and approve the levy, collection, and enforcement of special assessments by resolution, as provided by and consistent with Florida law and this Agreement. Prior to any vote of the Governing Board to levy a special assessment, the Authority will conduct, or hire a consultant to conduct, an assessment study. If such a study was performed on behalf of County and/or Municipal Parties prior to the creation of the Authority, the Governing Board may, in lieu of having a new study performed, adopt the findings of such earlier study if the Governing Board determines that such findings remain valid and reliable despite the passage of time.

9.3. Revenue Bonds and Other Instruments. The Governing Board will determine the need for the issuance of any bonds or other instruments related to short- or long-term borrowing, and the need for letters of credit that it deems necessary or convenient for the operation of the Authority.

9.4. The Governing Board must establish, and may amend, a maximum amount of aggregate debt that may be approved by the Executive Committee. The Executive Committee may approve the issuance of any debt in the aggregate up to that maximum amount. Any debt that exceeds that maximum amount will not be issued unless approved by the Governing Board.

9.5. Annual Budget. The Authority, through the Governing Board, must adopt an annual budget for each fiscal year, consistent with the requirements of Florida law as well as any procedural requirements established by local authorities such as the Broward County Property Appraiser and Broward County Tax Collector.

ARTICLE 10. AUDITING

10.1. The Executive Committee must appoint an external auditor to serve as auditor to the Authority ("Auditor"). The Auditor will, among other things, complete an annual audit of the Authority's receipts and expenditures. The Auditor will report directly to the Governing Board.

10.2. The Executive Committee will appoint five (5) of its members to serve on a Standing Audit Committee. The Standing Audit Committee will be responsible for the selection process for engaging and recommending an Auditor to the Executive Committee for appointment.

ARTICLE 11. COMMITMENT OF SYSTEM WASTE

11.1. Commitment of System Waste. The Parties must cause all System Waste that is: (a) identified by the Master Plan as acceptable for delivery into the System, and (b) generated in the Parties' respective boundaries (for County, within the unincorporated area), to be collected, transported, delivered, and deposited at the designated receiving facilities of the System pursuant to the Master Plan or annual plan of operations, except for System Waste that is transported outside the State of Florida. Except with the prior express written consent of the Authority, no Party will deliver (directly or by contract) into the System any waste, debris, substance, constituent, object, or material that does not qualify as System Waste.

11.2. Regulatory Flow Control. No later than the effective date of the Facilities Amendment, each Party agrees to enact a flow control ordinance pursuant to Section 403.713, Florida Statutes, in a form provided by the Authority, directing that all System Waste generated within its respective geographic boundaries (for County, within the unincorporated area) be delivered to the System, as designated in the Master Plan, except for such waste that is to be transported outside the State of Florida ("Flow Control Ordinance"). Each Party shall maintain their respective Flow Control Ordinances in effect throughout its participation as a Party. Nothing in this section requires a Party to enact a Flow Control Ordinance that operates to terminate or breach any existing contractual agreement the Party has in place prior to becoming a Party ("Conflicting Agreements"); however, each Party must provide copies of all such Conflicting Agreements to the Authority at the time it becomes a Party and shall not renew or extend any such Conflicting Agreement. For those Parties with existing Conflicting Agreements in place on the Effective Date, the adoption of a Flow Control Ordinance under this section must specify that it becomes effective upon the expiration or earlier termination of such existing Conflicting Agreements. Notwithstanding anything else contained herein, this Agreement does not require any Party to violate the prohibitions in Sections 403.7046(2) or 403.713(2), Florida Statutes, concerning the sale and management of Recovered Materials.

11.3. Each Party agrees to include in any Hauler contracts or contract amendments executed after the Effective Date, a provision that all System Waste must be delivered to the System, except for any waste generated within that Party's then-current geographic boundaries that is shown to be destined for recycling or disposal outside the State of Florida, and each Party must strictly enforce such contract obligation. In each such contract and all contract amendments, the Authority must be expressly identified as a third-party beneficiary for the sole purpose of

enforcing such provisions, if enforcement is necessary, to ensure the delivery of System Waste to the System. Prior to initiating any such enforcement action, the Authority must communicate and coordinate with the relevant Party.

11.4. System Waste Reporting Ordinance. Each Party agrees to enact and maintain in effect a System Waste reporting ordinance, in a form provided by the Authority, directing that each Hauler report on a monthly basis all of the following information to their contracting Party or Parties, with a copy to the Authority:

11.4.1. The amount of each category of System Waste collected in each Party's jurisdiction in cubic yards or tons.

11.4.2. Where each category of System Waste collected by the Hauler has been transported. Identification will be by the name and address of the receiving facility.

11.4.3. The quantity (either by volume, weight, or number and size of all trucks or containers) of System Waste that is not processable by a waste-to-energy plant or other System facility that has been collected by the Hauler and that is to be transported outside the State of Florida.

11.4.4. Where the System Waste that is not processable by a waste-to-energy plant or other System facility has been transported outside of the State of Florida. Identification will be by the name and address of the receiving facility.

The System Waste reporting ordinance provided in this section must be adopted by each Party no later than the date determined by the Executive Committee, which shall be no earlier than the date of adoption of the Master Plan.

11.5. With the prior consent of the Authority, any Party may appoint the Authority as its agent for the enforcement of obligations in any agreement, license, permit, franchise, or other arrangement related to the obligations of this article.

11.6. Each Party agrees to include the obligation to comply with the requirements of the ordinances required by Sections 11.2 and 11.4, respectively, in all applicable agreements, licenses, permits, franchises, or other arrangements with Haulers entered into on or after the Effective Date.

11.7. Title to and Interest in System Waste. The Parties relinquish to the Authority any and all title to and interest in System Waste collected within their respective boundaries, effective upon delivery of that System Waste to the System. To the maximum extent provided under applicable law, and except as otherwise provided herein, upon delivery of their System Waste to the Authority, the Parties also relinquish to the Authority all liability for the proper management and disposal of such System Waste.

11.8. Commitment Limited by Existing Agreements. Notwithstanding anything to the contrary in this Agreement, the Authority will not, and this Agreement will not, require any Party to take

any action that would breach or conflict with any current agreement concerning System Waste, including, without limitation: the June 2012 agreement between County and Wheelabrator Environmental Systems Inc. (now WIN-Waste Innovations, Inc.) for solid waste disposal services and the May 2015 Global Amendment thereto; the September 2012 interlocal agreement for solid waste disposal support services, as amended; the April 2015 Settlement Agreement between Waste Management Inc. of Florida and the City of Coconut Creek; any debris clearing or temporary debris management site contract that predates the Effective Date; or any Hauler contract that predates the Effective Date. In addition, the Authority will not, and this Agreement will not, require any Party to take any action that would breach or conflict with the Interlocal Agreement between Broward County and various municipalities for Optional County Services for Keep Broward Beautiful, Household Hazardous Waste and Electronics, and Bulk Trash and Yard Waste Drop-Off Programs, or any successor agreement concerning Household Hazardous Waste.

ARTICLE 12. DEBT OBLIGATIONS

Except as expressly provided in this Agreement or applicable law, any debt obligations incurred by the Authority will be the sole obligation of the Authority and will not be an indebtedness of any Party or Parties within the meaning of any constitutional, statutory, charter, ordinance provision, or other limitation of such Party. No Party is obligated to pay or cause to be paid any amounts due under this Agreement except as expressly provided or incorporated herein, and no Party pledges its full the faith and credit for the payment of any such amounts.

ARTICLE 13. RELATIONSHIPS OF THE PARTIES

Except as set forth herein, nothing in this Agreement imposes upon any Party any responsibility whatsoever with respect to services provided or contractual obligations assumed by any other Party, and nothing in this Agreement will be deemed to make any Party a partner, agent, or local representative of any other Party or to otherwise create any type of fiduciary responsibility or relationship of any kind whatsoever among the Parties, except as expressly stated herein. The obligations created and imposed by this Agreement are not joint; rather, such obligations are separate and several among the Parties.

ARTICLE 14. INDEMNIFICATION

14.1. Indemnification Obligations. The Authority will, at its sole cost and expense, indemnify, hold harmless, and defend ("Indemnification Obligations") each Party and each Party's current, past, and future officers, agents, and employees (each, an "Indemnified Party"), to the maximum extent permitted by law, from and against any and all causes of action, demands, claims, counterclaims, third-party claims, administrative actions, damages of any kind (including, without limitation, personal injury or bodily harm), destruction, losses, liabilities, costs (including, without limitation, costs of investigations, assessments, clean up, fines, violations, punitive damages, regulatory reopeners, and/or remediation), and expenditures of any kind, including, without limitation, attorneys' fees, court costs, and expenses, including through the conclusion of any appellate proceedings, for the matters described in this section and/or in Sections 14.2 and 14.3 below (each a "Claim"). Notwithstanding the Indemnification Obligations

in this article, nothing herein shall act as a waiver by a Party or the Authority of any limitation on liability, including but not limited to sovereign immunity and limitations on tort liability as provided in Section 768.28, Florida Statutes.

14.2. System-Related Claims. The Authority must fulfill its Indemnification Obligations to each Indemnified Party, regardless of whether the Indemnified Party allegedly or actually caused, directly or indirectly, in whole or in part, any Claim(s) arising from, relating to, or in connection with, any or all of the following:

(a) any alleged, threatened, or actual presence or release of any Hazardous Materials in, on, above, or under any site that is or was part of the System at a time when such Hazardous Materials were threatened to be released or actually present or released;

(b) any actual, proposed, or threatened use, treatment, storage, holding, existence, disposition, discharge, or other release, generation, production, manufacturing, processing, refining, control, management, containment, abatement, removal, handling, or transfer of any Hazardous Materials located in, under, on, or above any site that is or was in the System, or transportation of any Hazardous Materials to or from the System (collectively, "Covered Activity");

(c) any actual or proposed assessment, clean up, and/or remediation of any Hazardous Materials at any time located in, under, on, or above any site that is or was in the System, whether or not such assessment, clean up, and/or remediation is voluntary or pursuant to court or administrative order, including any resulting or required clean up, control, management, containment, abatement, removal, remedial, or corrective action;

(d) the imposition, recording, or filing or the threatened imposition, recording, or filing of any environmental lien encumbering any site that is or previously was part of the System at any time during the Term;

(e) any past, present, or threatened injury to, destruction of, or loss of natural resources relating to the construction, use, operation, or maintenance of the System or within the System, including claims for damages, contribution, costs to investigate and assess such injury, destruction, or loss; or

(f) any actual or threatened failure to comply with any debt obligation incurred by the Authority.

14.3. Claims for Acts or Omissions of Authority Actors. The Authority must fulfill its Indemnification Obligations to each Indemnified Party for Claims that are caused or alleged to be caused, in whole or in part, by any act or omission of the Authority, its officers, employees, agents, or contractors acting on behalf of the Authority (collectively, "Authority Actors") for any Claims, including, without limitation, those arising from, relating to, or in connection with one or more of the following by one or more Authority Actors:

(a) any actual or threatened breach of any obligation contained within or undertaken as a result of this Agreement;

(b) any failure to comply with any provision or material obligation contained within or undertaken as a result of the Master Plan;

(c) any intentional, reckless, or negligent act or omission;

(d) arranging for storage, handling, treatment, disposal, or transport of Hazardous Materials to, from, or at any facility or incineration vessel containing such or similar Hazardous Materials; or

(e) any past, present, or threatened noncompliance with or violation of: (i) any environmental laws, including, without limitation, Chapter 27 of the Broward County Code of Ordinances, Florida Statutes Chapters 376 and 403, Chapters 62-701 through 62-787 of the Florida Administrative Code, the Clean Water Act, 33 U.S.C. § 1321, et seq., RCRA, 42 U.S.C. § 6901, et seq., CERCLA, 42 U.S.C. § 9601, et seq., Toxic Substances Control Act, 15 U.S.C. § 2601, et seq., 40 C.F.R. Parts 239 through 799, 49 C.F.R. § 172.101; (ii) any ordinance, regulation, standard, condition, requirement, permit, license, or authorization; or (iii) any order of any governmental authority.

14.4. Defense of Claims. The Authority must, upon written notice of a Claim from an Indemnified Party, defend that Indemnified Party with counsel selected by the Authority and approved by the Indemnified Party, which approval will not be unreasonably withheld.

14.5. Right to Withhold. If considered necessary by an Indemnified Party, any amounts due the Authority from that Indemnified Party under Section 5.4, whether as provided for in this Agreement or any subsequently adopted Master Plan, may be retained by the Indemnified Party until all Claims against the Indemnified Party subject to the Indemnification Obligations have been settled or otherwise resolved by the Authority. Any withheld amounts shall not be subject to payment of interest.

14.6. Exclusions. Notwithstanding anything in this article to the contrary, nothing in this Agreement will be construed to require the Authority (or any successor thereto) to fulfill the Indemnification Obligations if prohibited by applicable law (including, without limitation, the restrictions stated in Section 768.28(19), Florida Statutes), or in connection with a Claim in which an Indemnified Party seeks to be relieved of its statutory liabilities, with exceptions for joint and several liabilities, caused by that Indemnified Party's intentional delivery (whether directly or indirectly, including by contract) of previously known Hazardous Materials into the System without the prior express written consent of the Authority. Nothing in this article limits the defenses available to the Authority (including under Section 768.28, Florida Statutes) in the defense of an Indemnified Party pursuant to the Indemnification Obligations.

14.7. Survival of Indemnification Obligations. The Authority's Indemnification Obligations survive the expiration or earlier termination of this Agreement.

ARTICLE 15. DEFAULT

If any Party or the Authority fails to perform or observe any of the material terms and conditions of this Agreement and fails to cure such failure within sixty (60) days after receipt of written notice of such default from another Party or from the Authority (or, if such failure cannot be reasonably be cured within sixty (60) days, the Party fails to promptly initiate and diligently pursue cure to completion), then in addition to any other claim at law or in equity, the Party giving the notice of default shall be entitled, but is not required, to seek specific performance of this Agreement. The Parties acknowledge that money damages may be an inadequate remedy for the failure to perform and that the Party giving notice is entitled to obtain an order requiring specific performance, injunction, or other equitable relief. Failure of any Party to exercise its rights in the event of any breach by another Party shall not constitute a waiver of such rights. No Party shall be deemed to have waived any failure to perform by another Party unless such waiver is in writing and signed by the waiving Party, with such waiver limited to the terms specifically contained therein.

ARTICLE 16. AMENDMENTS TO THIS AGREEMENT

16.1. Except as expressly authorized in Sections 3.3, 8.1.8, and this article, this Agreement may only be amended as follows:

16.1.1. The Executive Committee is responsible for recommending proposed amendments to this Agreement to the Governing Board.

16.1.2. Upon approval of a proposed amendment to this Agreement by the Governing Board, the Executive Director shall provide notice of the proposed amendment to all Parties of the Authority by forwarding a copy to each Party for consideration by that Party's elected body.

16.1.3. Any amendment that substantively modifies any of the following provisions, or that concerns any of the following subjects, will not be effective unless approved by every Party's elected body:

16.1.3.1. Article 3 (Formation);

16.1.3.2. Article 4 (Duration);

16.1.3.3. Section 6.2.1 (Governing Board Membership);

16.1.3.4. Section 6.3.1 (Executive Committee Membership);

16.1.3.5. Section 6.8 (Major Decisions);

16.1.3.6. Section 8.1 (Powers of the Authority), except for Section 8.1.8;

16.1.3.7. Article 12 (Debt Obligations);

16.1.3.8. Article 14 (Indemnification);

16.1.3.9. Article 17 (Dispute Resolution Process; Authority Liability; Choice of Law, Venue, Jury Trial Waiver);

16.1.3.10. Wind Down (as defined in Section 3.3.3.2); or

16.1.3.11. Disposition of assets owned by the Authority.

16.1.4. Except as otherwise provided in this Agreement, all amendments are effective if approved by the elected bodies of Parties representing at least two-thirds (2/3) of the total population of the Parties plus a majority of the Parties; however, if a Party does not give notice of its elected body's rejection of the proposed amendment within ninety (90) days after that Party received notice of the amendment, that Party will be deemed to have approved the amendment.

16.1.5. Notwithstanding Section 16.1.4, no amendment that directly or indirectly: (a) creates any additional liability or obligation of any one Party (but not all Parties), (b) disproportionately removes a right of only one Party, or (c) has a disproportionate adverse effect on any Party, will be effective unless it is approved by such Party (or Parties) as evidenced by the adoption of a resolution approving the amendment by that Party's (or Parties') elected body.

16.1.6. This Agreement may not be amended to provide greater powers to the Governing Board, the Executive Committee, or the Executive Director than have been granted to the Authority.

16.2. Unless the amendment states otherwise, the amendment will take effect upon certification by the Governing Board that the necessary approvals of the Parties have been obtained.

ARTICLE 17. DISPUTE RESOLUTION PROCESS; AUTHORITY LIABILITY; CHOICE OF LAW, VENUE, JURY TRIAL WAIVER

17.1. Informal Dispute Resolution. The following procedure will apply to resolve a dispute between the Authority and any number of Parties, or between Parties, relating to matters arising out of this Agreement ("Dispute"): (i) the Authority or the Party will issue written notice of the Dispute to the Party or the Authority, as applicable, and any other applicable Parties; and (ii) the parties to the Dispute will use reasonable efforts to resolve the Dispute within sixty (60) days after the written notice, including through informal settlement meetings, discussions, mediation, or other process as may be agreed among them. The parties to the Dispute may jointly agree to extend the day deadline for informal dispute resolution.

17.2. Formal Dispute Resolution. If the Dispute is not fully resolved through the informal dispute resolution process described in Section 17.1, the parties to the Dispute will follow the

conflict resolution procedures for governmental disputes as provided in Chapter 164, Florida Statutes.

17.3. Failure to Resolve through Formal Dispute Resolution. If the processes required by Sections 17.1 and 17.2 fail to resolve the Dispute, the Authority and/or applicable Parties may litigate such Dispute.

17.4. Court-Ordered Dissolution of Authority; Termination of Agreement. In addition to any remedy at law or equity that a Party may have against the Authority, if a court of competent jurisdiction enters a final judgment that (a) the Authority is incapable of performing the services for which it was created, or (b) the actions or inactions of the Authority have prevented County from performing its obligations under Section 403.706, Florida Statutes, such court may order monetary damages (against the Authority but not against any members of the Authority) or equitable relief including, without limitation, the termination of this Agreement and the dissolution of the Authority.

17.5. Authority Liability for Capital Expansion of County Solid Waste Disposal Facilities. In addition to any other damages or remedies at law or in equity, if the Authority fails to perform its obligations under Sections 7.2 or 7.3 and, as a result, County undertakes an expansion of its solid waste disposal facilities to ensure it can satisfy its statutory obligations under Section 403.706, Florida Statutes, to provide disposal capacity for Authority Solid Waste generated in each Party's jurisdiction, the Authority shall be liable and responsible for payment to County of costs incurred by County for such capital expansion through the end of the of the remaining projected useful life of the disposal facility or facilities. Neither a reduction in the amount of Authority Solid Waste disposed of because of increases in the amount of Recyclable Materials lawfully processed or recycled at an appropriate site, nor a reduction in Authority Solid Waste disposal capacity at any Authority-owned facility resulting from County's exercise of its right of first refusal, pursuant to Article 18, shall be deemed a failure by the Authority to perform its obligations under Sections 7.2 or 7.3 of this Agreement.

17.6. Choice of Law; Venue; Waiver of Jury Trial. This Agreement and all disputes between the Parties and the Authority arising out of or relating to this Agreement shall be construed in accordance with and governed by the laws of the State of Florida. The sole and exclusive venue for any litigation related to or arising out of this Agreement, or the duties and responsibilities of the Authority and the Parties, shall be in State Courts of the Seventeenth Judicial Circuit, in and for Broward County, Florida. **EACH PARTY KNOWINGLY, VOLUNTARILY, AND UNEQUIVOCALLY WAIVES ANY RIGHTS IT MAY HAVE TO A TRIAL BY JURY FOR ANY CLAIMS, WHETHER IN CONTRACT, TORT, OR STATUTE, ARISING OUT OF OR RELATING TO THIS AGREEMENT.**

ARTICLE 18. RIGHT OF FIRST REFUSAL

18.1. Prior to entering an agreement to sell real property owned by the Authority of any value, including the associated material property, plant, or equipment (collectively referred to as "Authority Property"), the Authority must provide a copy of the offer, letter of intent, or proposed agreement ("Offer") to all Parties. The Parties will have a right of first refusal to

purchase the Authority Property at the same price, and on the same terms and conditions, as the Offer, as provided below:

18.1.1. If the Authority Property is a "solid waste disposal facility," as defined in Section 403.703, Florida Statutes (2022), County will have the right of first refusal. If County does not exercise the right of first refusal provided in this section, the Municipal Party or Municipal Parties where the Authority Property is located will have the right of first refusal.

18.1.2. For all other Authority Property, the Municipal Party, Municipal Parties, and/or County (for Authority Property located within unincorporated Broward County) where the subject Authority Property is located will have the right of first refusal. For Authority Property located within the territorial jurisdiction of more than one local governmental entity (e.g., two Municipal Parties or a Municipal Party and unincorporated Broward County), the right of first refusal may be exercised jointly or, if one Party elects not to exercise the right, by the other applicable Party. If no Municipal Party exercises the right of first refusal provided in this section, County will have the right of first refusal.

If the applicable Party does not provide the Authority with notice of its intent to exercise its right of first refusal within sixty (60) days after the Authority provides the Parties with a copy of the Offer, the Authority may proceed with the sale of the Authority Property. If County does not provide the Authority with notice of its intent to exercise the right of first refusal as provided in Section 18.1.1, the relevant Municipal Party or Municipal Parties will have sixty (60) days after receipt of notice from the Authority that County has not exercised its right to provide notice of intent to exercise its right of first refusal. If no Municipal Party provides the Authority with notice of its intent to exercise the right of first refusal as provided in Section 18.1.2, County will have sixty (60) days after receipt of notice from the Authority that no applicable Municipal Party has exercised its right to provide notice of its intent to exercise its right of first refusal.

ARTICLE 19. MISCELLANEOUS

19.1. Assignment. Except in the event of merger between Parties or the dissolution of a Party, wherein the successor to the Party will automatically become a Party, this Agreement, or any interest herein, may not be assigned, transferred, or otherwise encumbered, under any circumstances by any Party without the prior written consent of all other Parties to this Agreement, which will not be unreasonably withheld. Subject to Section 6.8, nothing herein will be deemed to restrict or prohibit the Authority's assignment of its rights and obligations as is deemed necessary or appropriate by the Authority for the provision of services under this Agreement.

19.2. Notices. All notices, consents, and other communications required, permitted, or otherwise delivered under this Agreement must be in writing and delivered either by hand with proof of delivery or mailed by first class registered or certified mail, return receipt required, postage prepaid, with contemporaneous email, and in any case must be addressed to each Party's mayor, with copies to its chief executive officer (e.g., City/Town Manager, County

Administrator, etc.) and its chief legal officer (e.g., City/Town Attorney, County Attorney, etc.), at the address of its main headquarters. Notices, consents, and other communications given by mail in accordance with this section will be deemed to have been given five (5) business days after the postmarked date; notices, consents, and other communications given by any other means will be deemed to have been given when received.

19.3. Incorporation of Agreements. This Agreement supersedes all prior negotiations, correspondence, conversations, agreements, or understandings, applicable to the matters contained therein. Accordingly, it is agreed that no deviation from the terms hereof shall be predicated upon any prior representations or agreements, whether oral or written.

19.4. Incorporation by Reference. Any and all recital clauses stated above are true and correct and are incorporated in this Agreement by reference.

19.5. Severability. In the event that any provision of this Agreement shall, for any reason, be determined to be invalid, illegal, or unenforceable in any respect, then (a) that provision is to be construed either by modifying it to the minimum extent necessary to make it enforceable (if permitted by law) or disregarding it (if not), and (b) the Parties shall negotiate in good faith and agree to such amendments, modifications, or supplements to this Agreement or such other appropriate actions as shall, to the maximum extent practicable, implement and give effect to the intentions of the Parties. If an unenforceable provision is modified, disregarded, or amended in accordance with this section, the rest of this Agreement is to remain in effect as written.

19.6. Representations and Warranties. Each Party hereby represents and warrants as to itself as follows:

19.6.1. It is duly organized and validly existing under the constitution and laws of the State of Florida, with full legal right, power, and authority to enter into and perform its obligations hereunder;

19.6.2. This Agreement has been duly authorized, executed, and delivered by it and constitutes its legal, valid, and binding obligation, enforceable against it in accordance with its terms (except as such enforceability may be limited by Article X, Section 13 of the Florida Constitution or by bankruptcy, moratorium, reorganization or similar laws affecting the right of creditors generally);

19.6.3. Neither the execution nor delivery of this Agreement, nor the performance of such Party's obligations hereunder nor the fulfillment of the terms herein: (a) conflicts with, violates or results in a breach of the Constitution, any law or government regulation of the State of Florida, or any other local law or ordinance; or (b) conflicts with, violates, or results in any breach of any term or condition of any judgment or decree, or any agreement or instrument to which it is a party or by which it or any of its properties or assets are bound, or constitutes a default thereunder; and

19.6.4. Except for the procedures provided under Chapter 163 and Chapter 75, Florida Statutes, and such action as has already been taken, no approval, authorization, or order of, or any consent or declaration, registration or filing with, any governmental authority of the State of Florida, or any referendum or other action of voters by election, is required for the valid execution, delivery, and performance of this Agreement by it.

19.7. The applicable financial disclosure, noticing, and reporting requirements of the Authority shall be those provided by general law.

19.8. Intellectual Property. The Authority will have all right, title, and interest in and to any intellectual property created by or for the Authority. No other Party will make any claim of ownership to any such intellectual property or will have any rights to the intellectual property other than as expressly set forth in a written agreement between the Board and that other Party.

19.9. Sovereign Immunity. Except to the extent sovereign immunity is expressly waived by entering into this Agreement among the Parties, nothing herein is intended to serve as a waiver of sovereign immunity by any of the Parties nor shall anything included herein be construed as consent by any of the Parties to be sued by third parties in any matter arising out of this Agreement.

19.10. Interpretation. Terms such as "herein" refer to this Agreement as a whole and not to any particular sentence, paragraph, or section where they appear, unless the context otherwise requires. Any references to "must," "shall," or "will" are obligatory. All citations to "Florida Statutes" mean those statutes as may be amended from time to time, except for references to the term "solid waste disposal facility," as defined in Section 403.703, Florida Statutes (2022). Any reference to "days" means calendar days, unless otherwise expressly stated.

19.11. Third-Party Beneficiaries. The Parties do not intend to directly or substantially benefit a third party by this Agreement. Therefore, the Parties acknowledge that there are no third-party beneficiaries to this Agreement and that no third party shall be entitled to assert a right or claim against any of them based upon this Agreement.

19.12. Counterparts and Multiple Originals. This Agreement may be executed in multiple originals, and may be executed in counterparts, whether signed physically or electronically, each of which shall be deemed to be an original, but all of which, taken together, shall constitute one and the same agreement.

19.13. Joinder by Authority. This Agreement is contingent upon the Authority, by majority vote of the Governing Board at its first meeting, agreeing to the terms, conditions, and obligations of the Authority as provided for in this Agreement and execution of the joinder of Authority provided for herein. Other than ministerial matters of procedure of the Governing Board, including election of a Chair and Vice-Chair, and other than executing the joiner, the Authority may not exercise any power under this Agreement until and unless it has executed such joinder, and this Agreement automatically terminates should the Governing Board fail to join in this Agreement by the end of its first meeting.

19.14. No Damages for Compliance with Future Applicable Law; Litigation Court Orders impacting Authority Operations. If any Party fails to meet its responsibilities or perform its obligations under this Agreement as a result of actions it takes in compliance with applicable laws, codes, advisory circulars, rules, regulations, ordinances, or orders of any federal, state, or other governmental entity (other than orders of the Party itself) issued, enacted, adopted, or promulgated after the Effective Date ("Future Applicable Law"), that Party shall not be liable to any other Party or to the Authority for damages, provided that such Party: (a) pursues any colorable challenge to the Future Applicable Law and the challenge proves unsuccessful (in whole or in applicable part); (b) issues written notice, with contemporaneous email, to the Authority and to all Parties within fifteen (15) days after the filing of or the initiation of such litigation; and (c) consents to intervention by the Authority and any other Party in such litigation. In addition, if a Party is named as a defendant in any litigation concerning solid waste, recycling, or issues likely to impact the Authority's operations or that Party's obligations under the Agreement, that Party must provide written notice of same to the Authority and all Parties within fifteen (15) days after the litigation was filed or the issue(s) otherwise arose (in the event the issue will be considered by any court within such fifteen (15) day period, such notice shall be provided as promptly as is practical after the Party receives notice of such pending court consideration) and consent to intervention in such litigation by the Authority and any other Party.

19.15. Notwithstanding anything to the contrary contained within or alluded to in this Agreement, nothing in this Agreement shall in any way diminish or modify any right or power of County to take the following actions before the Formation Conditions have been met:

19.15.1. Implement any recycling program County determines will help meet recycling goals established by the state or the Authority or identified by any expert retained by County, the Solid Waste Working Group established by the "Memorandum of Understanding Regarding Collaborative Study and Subsequent Development of an Integrated Solid Waste and Recycling System" between Broward County municipalities and County with an effective date of October 1, 2019, or the Authority; or

19.15.2. Contract for solid waste disposal capacity, or options therefor, with reasonable opportunities for coordination with representatives of the Authority, on such terms and conditions County determines will benefit the public, provided that the terms of any such agreement(s) contain a provision: (a) permitting County to assign the agreement(s) to the Authority after the Formation Conditions have been met; and (b) the Authority is not bound by such agreement(s) without its consent.

In addition, nothing contained within or alluded to in this Agreement shall at any time or in any way impede County from acting as it deems prudent to enable it to offer solid waste disposal capacity to municipalities that are not a party to the Agreement.

19.16. No Additional Financial Obligations. Notwithstanding anything to the contrary in this Agreement, prior to the Formation Conditions being met, the Authority shall take no action that in any way obligates any Party or Broward County resident to expend any money other than the amounts funded by the Parties as expressly stated in Section 5.4. The restrictions of this Section

19.16 shall not apply to any costs incurred by a Party pursuant to the Independent Counsel Procedures referenced in Section 6.10.2.

[The remainder of this page is intentionally left blank.]

IN WITNESS WHEREOF, the Parties hereto have made and executed this Agreement on the respective dates under each signature on behalf of each Party to this Agreement, signing by and through its Mayor or Vice-Mayor, authorized to execute same by action of its elected body.

[SIGNATURE PAGES OF PARTIES TO FOLLOW]

JOINDER BY AUTHORITY

By affirmative vote of the Governing Board of the Authority, signing by and through its Chair or Vice-Chair, the Authority hereby joins in this Agreement and further agrees to be bound by all terms, conditions, and obligations stated herein that apply to the Authority.

Signed: _____

Print Name: Greg Rose

Title: Chairperson

Date: 10/23/23

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement: BROWARD COUNTY through its BOARD OF COUNTY COMMISSIONERS, signing by and through its Mayor or Vice-Mayor, authorized to execute same by Board action on the 23 day of May, 2023, and the Municipal Parties, signing by and through their authorized signers.

COUNTY

ATTEST:

Broward County Administrator, as
ex officio Clerk of the Broward County
Board of County Commissioners

BROWARD COUNTY, by and through
its Board of County Commissioners

By _____
Mayor

_____ day of _____, 2023

Approved as to form by
Andrew J. Meyers
Broward County Attorney
115 South Andrews Avenue, Suite 423
Fort Lauderdale, Florida 33301
Telephone: (954) 357-7600

By Matthew Haber Digitally signed by Matthew Haber Date: 2023.05.15 11:47:44 -04'00'
Matthew Haber (Date)
Assistant County Attorney

By Nathaniel Klitsberg Digitally signed by Nathaniel Klitsberg Date: 2023.05.15 15:53:47 -04'00'
Nathaniel A. Klitsberg (Date)
Senior Assistant County Attorney

COCONUT CREEK

WITNESS:

Danielle Newdak

Danielle Newdak

Print or type name

WITNESS:

Jaqueline Reaves

Jaqueline Reaves

Print or type name

ATTEST:

Joseph J. Kavanagh, City Clerk

CITY OF COCONUT CREEK

Joshua Rydell, Mayor

__ day of May ,20__

Karen M. Brooks, City Manager

APPROVED AS TO FORM BY:

Terrill C. Pyburn, City Attorney

INTERLOCAL AGREEMENT FOR SOLID WASTE DISPOSAL AND RECYCLABLE MATERIALS PROCESSING AUTHORITY OF BROWARD COUNTY

MUNICIPALITY

ATTEST:

Tedra Allen, City Clerk

CITY OF COOPER CITY

By: _____
Greg Ross, Mayor

_____ day of _____, 2023

I HEREBY CERTIFY that I have approved this Agreement as to form and legal sufficiency subject to execution by the parties:

_____
Jacob Horowitz, City Attorney

IN WITNESS WHEREOF, the CITY OF CORAL SPRINGS and BROWARD COUNTY have caused these present to be executed in their respective names by the proper officials the day and year first above written.

ATTEST:

GEORGIA ELLIOTT, CMC, City Clerk

CITY OF CORAL SPRINGS, FLORIDA

SCOTT BROOK, Mayor

APPROVED AS TO FORM:

John J. Hearn
City Attorney

MUNICIPAL SIGNATURE PAGE

By affirmative vote of the City Commission of the City of Dania Beach, Florida, signing by and through its Mayor or Vice Mayor, the City hereby joins in this Agreement and further agrees to be bound by all terms, conditions and obligations stated herein that apply to the City.

CITY:
CITY OF DANIA BEACH, FLORIDA, a Florida Municipal Corporation

ATTEST:

Elora Riera Digitally signed by Elora Riera Date: 2023.08.09 10:28:40 -04'00'

ELORA RIERA, MMC
CITY CLERK

Archibald J. Ryan IV Digitally signed by Archibald J. Ryan IV Date: 2023.08.09 10:28:19 -04'00'

ARCHIBALD J. RYAN IV
MAYOR

Ana M. Garcia Digitally signed by Ana M. Garcia Date: 2023.08.07 08:15:58 -04'00'

ANA M. GARCIA, ICMA-CM
CITY MANAGER

Dated: August 7, 2023

APPROVED FOR FORM AND CORRECTNESS:

Eve A. Boutsis Digitally signed by Eve A. Boutsis Date: 2023.08.04 16:06:54 -04'00'

EVE A. BOUTSIS
CITY ATTORNEY

INTERLOCAL AGREEMENT FOR SOLID WASTE DISPOSAL AND RECYCLABLE MATERIALS PROCESSING AUTHORITY OF BROWARD COUNTY, FLORIDA

TOWN OF DAVIE

TOWN OF DAVIE

WITNESS:

Gillian Brewster
Print or type name

By: _____
Mayor

7 day of June, 2023

WITNESS:

Armani Beaumont

By: _____
Town Administrator

ATTEST:

By: _____
Town Clerk

APPROVED AS TO FORM:
Allan Weinthal, Town Attorney

By: _____
Town Attorney

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement: BROWARD COUNTY through its BOARD OF COUNTY COMMISSIONERS, signing by and through its Mayor or Vice-Mayor, authorized to execute same by Board action on the 23 day of May 2023, and the CITY OF DEERFIELD BEACH, signing by and through their authorized signers.

CITY OF DEERFIELD BEACH

ATTEST:

HEATHER MONTEMAYOR, CITY CLERK

By _____
BILL GANZ, Mayor

18 day of July 2023

By _____ 7/18/23
CITY ATTORNEY (Date)

CITY OF FORT LAUDERDALE, a Florida municipal corporation

By: _____
DEAN J. TRANTALIS
Mayor

By: _____
GREG CHAVARRIA
City Manager

ATTEST:

By: _____
DAVID R. SOLOMON
City Clerk

Approved as to Legal Form and Correctness:
D'Wayne M. Spence, Interim City Attorney

By: _____
RHONDA MONTOYA HASAN
Assistant City Attorney

INTERLOCAL AGREEMENT FOR SOLID WASTE DISPOSAL AND RECYCLABLE MATERIALS PROCESSING AUTHORITY OF BROWARD COUNTY, FLORIDA

TOWN OF HILLSBORO BEACH, through its Town Commission, signing by and through its Mayor, authorized to execute the same by Commission action on the 6th day of June, 2023.

TOWN

ATTEST:

Sherry D. Henderson, CMC
TOWN CLERK

TOWN OF HILLSBORO BEACH, a municipal corporation

By: _____
TOWN MAYOR

Irene Kirdahy
Print Name

6th day of June, 20 23

APPROVED AS TO FORM:

_____
Donald J. Doody, Town Attorney

Designated Address for Notices include e-mail address(es):

Sherry D. Henderson, CMC Town Clerk
Town of Hillsboro Beach
1210 Hillsboro Mile,
Hillsboro Beach, FL 33062
SHenderson@TownofHillsboroBeach.com

Donald J. Doody, Town Attorney
GOREN, CHEROF, DOODY & EZROL Attorneys at Law
3099 East Commercial Boulevard, Suite 200
Fort Lauderdale, Florida 33308
DDoody@GorenCherof.com

CITY OF HOLLYWOOD

David Keller, Director
Financial Services

Joshua Levy, Mayor

15 day of August, 2023

George R. Keller, Jr. CPPT
City Manager

DS

ATTEST:

APPROVED AS TO FORM:

Patricia A. Cerny, MMC
City Clerk

Douglas R. Gonzales
City Attorney

Solid Waste Disposal and Recyclable Materials Processing Authority

LAUDERDALE LAKES

INTERLOCAL AGREEMENT FOR SOLID WASTE DISPOSAL AND RECYCLABLE MATERIALS PROCESSING AUTHORITY OF BROWARD COUNTY

Attest:

_____
Venice Howard
City Clerk

City of Lauderdale Lakes

By: _____
Veronica Edwards Phillips
Mayor

_____ day of _____, 2023

Approved as to form:

By: _____
Sidney C. Calloway
City Attorney

_____ day of _____, 2023

DocuSign Envelope ID: 789CE7F5-B0DF-4894-9BA9-FA3036DB147A

ATTEST:

DocuSigned by:

0CE1FD743A4A498...

Katrina Adler, Town Clerk

TOWN OF Lauderdale-By-The-Sea

DocuSigned by:

B0A8AE8CC88D4A1...

Chris Vincent, Mayor

Date: 7/11/2023 | 11:56 AM PDT

APPROVED AS TO FORM:

DocuSigned by:

7651C1375CC5435...

Susan Trevarthen, Town Attorney

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement: THE CITY OF LAUDERHILL through its CITY COMMISSION, signing by and through its Mayor, authorized to execute same by City Commission action via approval of Resolution No. 23R-04-116 on April 24, 2023.

CITY OF LAUDERHILL

ATTEST:

CITY CLERK – Andrea M. Anderson

(Seal)

CITY OF LAUDERHILL, FLORIDA

By _____
MAYOR - Ken Thurston

Date 5/25/23

By _____
CITY MANAGER – Desorae Giles Smith

Date 5/25/23

Approved as to Form:

Angel Petti Rosenberg
City Attorney

Date 5/25/23

INTERLOCAL AGREEMENT FOR SOLID WASTE DISPOSAL AND RECYCLABLE MATERIALS PROCESSING AUTHORITY OF BROWARD COUNTY

Village

Village of Lazy Lake

Attest:

By _____
Richard Willard
Mayor

_____
Tedra Allen
Village Administrative Assistant

10th day of June, 2023

Approved as to form:

By _____
Pamala H. Ryan
Village Attorney

5th day of June, 2023

CITY OF LIGHTHOUSE POINT

ATTEST:

City Clerk

CITY OF LIGHTHOUSE POINT

By: _____
Mayor

Kyle VanBuskirk
Print Name

27 day of October, 2023

I HEREBY CERTIFY that I have approved this Agreement as to form and legal sufficiency subject to execution by the parties:

City Attorney

LIGHTHOUSE POINT

CITY OF LIGHTHOUSE POINT

ATTEST:

City Clerk

CITY OF LIGHTHOUSE POINT

By: _____
Mayor

_____
Print Name

11 day of July, 2023

I HEREBY CERTIFY that I have approved this Agreement as to form and legal sufficiency subject to execution by the parties:

_____
City Attorney

JOINDER BY AUTHORITY

ADDITIONAL SIGNATURE PAGE

By affirmative vote of the Governing Board of the Authority, signing by and through its Chair or Vice-Chair, the Authority hereby joins in this Agreement and further agrees to be bound by all terms, conditions, and obligations stated herein that apply to the Authority.

Cale Curtis, City Manager

13th day of June, 2023

ATTEST:

Jennifer M. Johnson, City Clerk

13th day of June, 2023

APPROVED AS TO FORM:

David N. Tolces, Interim City Attorney

15th day of June, 2023

MARGATE

CITY OF MARGATE

Anthony N. Caggiano, Mayor

____ day of ____ 2023

Cale Curtis, City Manager

____day of _____, 2023

ATTEST:

Jennifer M. Johnson, City Clerk

____day of_____, 2023

APPROVED AS TO FORM:

David N. Tolces, Interim City Attorney

____day of _____, 2023

MIRAMAR

CITY OF MIRAMAR, FLORIDA

By: _____ Date: _____
Dr. Roy L. Virgin, City Manager

ATTEST:

_____
Denise A. Gibbs, City Clerk

Approved as to form and legal sufficiency
for the use of and reliance by the City of
Miramar only:

By _____
Austin Pamies Norris Weeks Powell, P.L.L.C
City Attorney

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement: CITY OF NORTH LAUDERDALE through its BOARD OF COMMISSIONERS, signing by and through its City Manager, authorized to execute same by Board action on the 13th day of June, 2023.

CITY

ATTEST:

ELIZABETH GARCIA-BECKFORD, CITY CLERK
8/2/23

CITY OF NORTH LAUDERDALE, by and through its Board of Commissioner's

By
CITY MANAGER MICHAEL SARGIS

2 day of August, 2023

APPROVED AS TO LEGAL FORM:

CITY ATTORNEY SAMUEL S. GOREN

IN WITNESS WHEREOF, the City of Oakland Park, Florida signing by and through its Mayor duly authorized to execute this Agreement by City Commission action taken on 6/7/23, 2023.

WITNESSES:

Michelle V. Hutchinson
Print Name

Robin Cargeo
Print Name

CITY OF OAKLAND PARK, FLORIDA,
a Florida municipal association

BY: _____
MAYOR

Date: July 26, 2023

Attest:

_____
RENEE SEROUT, CITY CLERK

R-2023-091

CITY OF OAKLAND PARK INCORPORATED 1929 FLORIDA

Notices:

As to Municipality:
Attn: David Hebert, City Manager
City of Oakland Park
3650 NE 12th Avenue
Oakland Park, FL 33334

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement on the respective dates under each signature: City of Parkland through its City Commission, signing by and through its Mayor, authorized to execute same by Commission action on the 17th day of May, 2023; and Broward County authorized to execute same.

CITY OF PARKLAND through its City Commission

By: _____
Richard W. Walker, Mayor

__ day of August, 2023

_____
Alyson Morales, City Clerk

By: _____
Nancy Morando, City Manager

__ day of August, 2023

Approved as to form and legality for the use of and reliance by the City of Parkland only:

(CITY SEAL)

By: _____
Anthony Soroka, City Attorney

___ day of August, 2023

MUNICIPAL SIGNATURE PAGE

TOWN OF PEMBROKE PARK

ATTEST:

Town Clerk

(Signature)

Marlen Martell

(Print or type name)

(SEAL)

By: _____

Ashira Mohammed, Mayor (Signature and Date)

APPROVED AS TO LEGAL FORM:

Interim Town Attorney (Signature)

Jacob Horwitz

(Print or Type Name

City of Plantation

Attest:

~~April Boggerow, City Clerk~~
Ekta Thompson, Asst. City Clerk

By: _____
Nick Sortal, Mayor

7th day of June, 2023

Approved As To Form:

By: _____

Name: Larry L Levi

Title: City Attorney

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement: BROWARD COUNTY through its BOARD OF COUNTY COMMISSIONERS, signing by and through its Mayor or Vice-Mayor, authorized to execute same by Board action on the 23 day of May 2023, and the Municipal Parties, signing by and through their authorized signers.

MUNICIPALITY

ATTEST:

VILLAGE CLERK

Village of Sea Ranch Lakes

By: _____
Village MAYOR

_____
Print Name

___ day of _____, 2023

I HEREBY CERTIFY that I have approved this Agreement as to form and legal sufficiency subject to execution by the Parties:

_____
Village Attorney

Solid Waste Disposal and Recyclable Materials Processing Authority

PASSED AND ADOPTED by the Town Council of the Town of Southwest Ranches, Florida, this 10th day of August, 2023.

Steve Breitkreuz, Mayor

ATTEST:

Russell Muñiz, Assistant Town Administrator/Town Clerk

Approved as to Form and Correctness:

Keith Poliakoff, J.D., Town Attorney

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement: CITY OF SUNRISE, through its Mayor, authorized to execute same on the 23rd day of May, 2023

CITY OF SUNRISE

ATTEST:

Felicia M. Bravo
City Clerk

CITY OF SUNRISE

By _____
Mayor Michael J. Ryan

13 day of June, 2023

Approved as to form for the
City of Sunrise

By _____
Kimberly A. Kisslan
City Attorney

INTERLOCAL AGREEMENT FOR SOLID WASTE DISPOSAL AND RECYCLABLE MATERIALS PROCESSING AUTHORITY OF BROWARD COUNTY, FLORIDA

PARTICIPATING COMMUNITY

ATTEST:

City Clerk

City of Tamarac

BY: _____
Michelle J. Gomez, Mayor

_____ day of _____, 2023

Approved as to form and legality:

By: _____
City Attorney

_____ day of _____, 2023

By: _____
Levent Sucuoglu City Manager

_____ day of _____, 2023

MUNICIPALITY

ATTEST:

Alexandra Grant, City Clerk

CITY OF WEST PARK

By: _____

Felicia M. Brunson, Mayor

27 day of OCTOBER, 2023

I HEREBY CERTIFY that I have approved this Agreement as to form and legal sufficiency subject to execution by the parties:

Burnadette Norris-Weeks, City Attorney

WEST PARK

MUNICIPALITY

ATTEST:

Alexandra Grant, City Clerk

CITY OF WEST PARK

By: _____
Felicia M. Brunson, Mayor

(RESOLUTION #2023-65)

8 day of AUGUST, 2023

I HEREBY CERTIFY that I have approved this Agreement as to form and legal sufficiency subject to execution by the parties:

Burnadette Norris-Weeks, City Attorney

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement on the respective dates under each signature: City of Weston through its City Commission, signing by and through its Mayor, authorized to execute same by Commission action on the 5th day of June 2023.

CITY OF WESTON, through its City Commission

By: _____
Margaret Brown, Mayor
21st day of August, 2023

Patricia A. Bates
Patricia A. Bates, MMC, City Clerk

By: _____
Donald P. Decker, City Manager/CEO

21st day of August, 2023

(CITY SEAL)

Approved as to form and legality
for the use of and reliance by the
City of Weston only:

By: _____
Jamie Alan Cole, City Attorney
21st day of August, 2023

WILTON MANORS

Municipal Party

ATTEST:

Faith Lombardo, J.D., CMC, City Clerk

CITY OF WILTON MANORS, FLORIDA

BY: _____
Scott Newton, Mayor

Approved as to form:

/s/ Kerry L. Ezrol
Kerry L. Ezrol, City Attorney

Solid Waste Disposal and Recyclable Materials Processing Authority

Appendix B

Project Framework Summary

July 25, 2024
File No.: 09224106.00

MEMORANDUM

TO: Todd Storti, Executive Director

FROM: The SCS Team

SUBJECT: Project Framework Summary

OVERVIEW

In order to develop a state-of-the-art solid waste management system, a partnership was formed between Broward County (County), most of the municipalities in the County, and the private sector in the 1980s. This partnership, which was known as the Resource Recovery System, was bound by an Interlocal Agreement (ILA), and resulted in a cost-effective, sustainable, and environmentally safe solid waste management system. As the ILA expiration date, which was tied to the retirement of the Industrial Development Bonds cosigned by the County and ILA Cities to develop the two modern waste-to-energy facilities by the private sector, drew near, the County convened a Solid Waste Visioning Summit. The purpose of the Solid Waste Visioning Summit, also known as the Trash Summit, was to develop a policy framework to manage uncertainty and begin considering the best value solution for the County stakeholders based on the following considerations: value and cost; governance and implementation; flexibility; control; and environmental stewardship.

Following the Trash Summit, the ILA Cities and the County elected to allow the ILA to expire, which allowed each former member to pursue their own path to manage solid waste generated in each municipality. Some infrastructure constructed and acquired during the ILA period was sold or dismantled, and new companies filled the solid waste disposal vacuum with claims of improved recycling and reduced disposal costs. As the disposal contracts for the first full term of service following the expiration of the ILA reached renewal or expiration, economic competition and concerns increased among several cities regarding the lack of long-term solid waste disposal alternatives and the risk of one or two large companies monopolizing solid waste disposal in the County and potentially leveraging that control into a collection monopoly, as well.

Due to the uncertainty of solid waste disposal in the County, several cities and the County re-opened dialogue to establish a scientific foundation for the identification and evaluation of facts, options, and alternatives available to help guide the Cities and County decision-makers as they develop a vision for the future of Broward Solid Waste Management and identify a means – including a roadmap – to achieve that vision. In June 2016, the Cities and County agreed to delay the sale of the Alpha 250 site, which was acquired during the ILA term, to allow sufficient time for an independent consultant to answer specific questions or issues identified in the first Amendment to the Settlement Agreement.

These events led to the County and several municipalities to form a Solid Waste Working Group (SWWG) and ultimately commissioning a Solid Waste and Recycling Issues Study (Arcadis Study). The Arcadis Study provided recommendations on various matters, including reaching a 75% countywide

recycling goal by 2020, retaining ownership of public land for the construction of solid waste or recycling facilities, and other supplemental approaches to solid waste management.

Through the SWWG, the County and participating municipalities also commissioned SCS Engineers to conduct waste generation and waste composition studies to gather important baseline data to supplement the Arcadis Study (Studies), which are in their final stages of completion.

OUTCOME OF THE STUDIES

The following elements were detailed in the Arcadis Study:

- How a 75% County-wide recycling goal may be reached
- Whether retaining public ownership of Alpha 250 would facilitate the meeting of that recycling goal or would provide other benefits in connection
- General solid waste disposal issues as determined by the Working Group, which may include options regarding flow control and potential governance or contractual structures for collaborative management of solid waste disposal.

Subsequently, an interlocal agreement (ILA) creating the Solid Waste and Recyclable Materials Processing Authority of Broward County, Florida (Authority) was executed by the County and 28 of the 31 municipalities within the County. The Authority issued a Request for Proposals for Consulting Services for the Preparation of a Regional Solid Waste and Recycling Master Plan (Master Plan). The SCS Team was selected to prepare the Master Plan.

THE SCS TEAM'S APPROACH TO DEVELOPING THE MASTER PLAN

The SCS Team's solid waste planning approach uses a zero-waste lens to identify and evaluate options to maximize the beneficial use of waste stream components while minimizing the waste stream components that have no beneficial use. The objective is to develop a clear pathway to implement an integrated and sustainable solid waste management system (System) that enables the Authority to meet or exceed the State's 75% recycling goal. This requires creating alignment amongst the Authority members as the current fragmented solid waste programs are unified under the Authority and the recommended System is implemented over a 40-year planning horizon and beyond. Our planning methodology not only focuses on the necessary and needed facilities, efficiencies, acquired technologies, and services for collection, treatment, and final disposal of waste, but also focuses on aligning the behaviors of those generating waste, public policies, and plans time horizons to produce lasting solutions.

Transparency is at the forefront of the SCS Team's approach. This is accomplished through continuous engagement with the Authority's Executive Director (or its designee) and Executive Committee to serve as the sounding board for the various elements of the Master Plan. While the decisions remain the responsibility of the Authority, we have found that employing the use of a working group selected by the Authority can help foster engagement and transparency in the planning process. This is especially important for providing a local lens to understand and appreciate the trade-offs between the choices made for services and facilities that will be recommended to achieve the implementation and goals of the Master Plan, but also ensuring those choices are affordable to County citizens, and provide de-risked, lasting solutions that fit the community and geographic uniqueness of the Authority and County at large.

SOURCES OF DATA THE CONSULTANT INTENDS TO UTILIZE

The SCS Team submitted the following data request to the Authority's Executive Director on June 13, 2024:

General

- The final executed Interlocal Agreement between the Authority, County and Municipalities.
- Solid Waste Management Plans for any ILA community members.
- Comprehensive Development Master Plan(s) for Broward County and each municipality that is party to the ILA that have been developed pursuant to Florida Statutes.
- Any other recent (i.e., post-2021) solid waste studies/reports or information from the County and municipalities not prepared by SCS or Arcadis.
- Public reports (i.e., monthly/annual collection, recycling, operations) from contracted service providers (e.g., Win Waste, Waste Connections, WM) delivered to public agencies by those service providers.
- Studies or reports on local pilot programs and tests for collection, disposal, recycling, diversion, or education.
- Any marketing studies on recyclable materials (e.g., paper, glass, plastic, metals, wood, concrete) or mulch, colored mulch, compost materials.
- Any solid waste-related carbon capture/life cycle analysis studies completed by any ILA communities.

Collection

- Current contracts and franchise agreements (residential, multi-family, and commercial) with waste collection, processing, and disposal service providers for each municipality for each ILA member.
- Summary of the collection systems (e.g., materials taken, frequency of pick-ups for each, public, contracted to a private vendor (franchise or non-franchise) for each ILA community.
- Confirm the maximum number of units in multi-family establishments with access to residential recyclable materials collection for each ILA community member.
- Identify any ILA communities that self-collect municipal solid waste or recyclable materials, and if so, what types of vehicles are used for the collection services.
- Backup information and documentation used to develop the 2017 through 2023 (2023 if available) Annual Solid Waste Management Reports, including certified and non-certified recycling tonnage, construction and demolition debris reports, County's MSW Management Worksheets, and facility reports.
- Applicable County and local ordinances regarding solid waste collection methods, enforcement, etc.

Financial

- Solid waste management budgets for each ILA community.
- The detailed breakdown of customer costs for collection, processing, and disposal and fees paid to the service providers and what is the associated annual residential assessment (and any other services are paid via the assessment) for each ILA community.
- Tip/Processing Fees and schedule of fees for each solid waste management facility and for each material, including any rate studies for the ILA communities.
- All municipal solid waste bonds and other financial obligations involving solid waste infrastructure owned by any ILA community member.

Infrastructure

- Landfill capacity reports for the BIC Landfill and Waste Management's Monarch Hill Landfill.
- All studies, reports, or other information pertaining to the history of the Alpha 250 site that were completed since 2018.
- A summary of all solid waste management assets owned by any ILA member and any associated maps, volume trend reports, other state or local studies of facility locations (e.g., operating and closed WTEs, landfills, transfer stations, residential recycling facilities, C&D recycling facilities, composting, anaerobic digestion, other recycling facilities, HHW system) within the County.
- State and local permits and facility locations (e.g., operating and closed WTEs, landfills, transfer stations, recycling facilities, compost/green waste facilities) within Broward County.
- Applicable County planning and other regulatory requirements for existing recycling facilities.
- Any adverse FDEP or federal actions/citations for public and private solid waste management assets owned by any ILA community member.

Education and Outreach

- Samples of current education materials for ILA community members.
- Confirm the preferred languages spoken / translations wanted for education and outreach material.
- Any public focus groups/surveys/reports done on communications, education, and outreach around disposal.
- Identify all social media channels / handles used by each ILA community (to identify existing communication channels for the Education and Outreach Plan).

The requested data is due to the SCS Team by July 19, 2024.

AUTHORITY'S INTENDED USE FOR THE MASTER PLAN

The Authority plans to use detailed recommendations provided in the Master Plan to inform its approach regarding facilities (e.g., facility type, size, placement), operations, and funding needed to create a regional solid waste and recycling system that is environmentally sustainable, transparent, innovative, and economically efficient in its approach to disposal, reduction, reuse, and recycling of the waste generated across the County.

RESOURCES NECESSARY TO OPERATE THE SYSTEM

Through the performance of its work, the SCS Team will complete the following tasks as part of developing the Master Plan, which will inform the development of an implementation plan and associated timeline:

- Evaluate Existing Solid Waste Disposal and Recycling Processes and Resources in Broward County
- Prepare a Financial Overview
- Conduct Future Needs Assessment
- Identify Regulatory Requirements and Conduct a Policy Review
- Prepare Recommendations and Findings
- Identify Innovative and Future Technologies
- Highlight Natural Areas Near Facilities
- Conduct Workshops

- Develop a Plan of Operations
- Facility Maintenance

REGULATORY REQUIREMENTS FOR MANAGING AND REDUCING WASTE ACROSS THE COUNTY

§403.706 (1) Fla. Stat. (2013) states that "[T]he governing body of a county has the responsibility and power to provide for the operation of solid waste disposal facilities to meet the needs of all incorporated and unincorporated areas of the county." Accordingly, the Master Plan must meet this requirement amongst its various desired outcomes.

PUBLIC ENGAGEMENT PROCESS

The public engagement process is comprised of education and outreach and workshops. The education and outreach activities include the following:

- Provide best practices for encouraging recycling, waste reduction, and waste diversion. Outline objectives that support the U.S. Environmental Protection Agency's waste management hierarchy (reduce, reuse, recycle/compost, recover/energy from waste, dispose/landfill). This subtask shall include recommendations for strategies, services, and programs to address waste reduction as well as recyclable materials and recovered materials processing, and appropriate public education regarding same.
- Identify best practices for use of multi-lingual communications delivering unified message to the public on sustainability, recycling best practices, and the System.
- Explore opportunities to partner with all schools located in Broward County to provide unified messages on the importance of waste hierarchy behaviors (reduce, reuse, recycle) that will drive conscious decisions to use the System and maximize it outputs before disposal.
- Explore and prioritize the best practice opportunities to effectively communicate, encourage, and increase access for recycling and organics recovery for commercial businesses and multifamily residences, using multi-lingual communication.

The results of this process will be documented in an education and outreach plan, the formal deliverable associated with this task.

The workshop activities include five (5) workshop public meetings. An initial public meeting will introduce the project and will be used to assess future needs. This approach is intended to foster transparency in the master planning process. By engaging the public early in the process and prior to developing the draft master plan, the Authority will be provided with an opportunity to share the history of solid waste and recyclable materials management in the County, present options and practical considerations related to collection, processing, and disposal. Hearing from the "voice of the customer" can provide valuable insights into public preferences and allow for a conversation around trade-off's of different options that will be addressed in the draft Master Plan.

Following the preparation of the Draft Master Plan, the remaining four (4) workshops will be held with members of the Authority, TAC, and relevant County and municipal staff, at which a quorum is not necessary. A second workshop will be held with the Broward League of Cities, consisting of all municipal elected officials in Broward County, at which a quorum of elected officials is not required. The last two workshops with the general public, the date, time, and location of that will be determined by the Contract Administrator, with at least one such workshop being held in the

evening, with the availability of the public to participate virtually and with multi-lingual capabilities, if requested.

GUIDING PRINCIPLES

The concept of developing guiding principles was introduced at the Project Kick-Off Meeting. For the purpose of the Master Plan, considering that the planning horizon is 40 years, the guiding principles can provide clarity in terms of where the Authority is now and where it wants to go in the future and can help achieve alignment within the Authority early in the project and will serve as the framework or lens that the SCS Team can use as it explores and analyzes different services, programs, and facilities. The following guiding principles are presented below in no particular order for consideration:

- **Zero Waste Focus** – taking a 'whole system' approach to services, programs, and facilities to minimize consumption and the associated waste generation and maximize beneficial reuse and recycling.
- **Environmental Compliance** - managing the impacts to the air, soil, water, and wildlife as well as "quality of life" impacts to the community such as aesthetics, odor, noise, and traffic.
- **Management Compliance** - satisfying the applicable growth management requirements for solid waste concurrency.
- **Long-term Disposal Solution** – achieving a reliable disposal approach over the 40-year planning horizon.
- **Commercially-Proven Technologies** - A technology that has been designed, constructed, and operated/implemented in the United States on a commercial scale (not a pilot plant or research facility) for at least one year in a reliable and consistent manner. The technology's capacity is appropriate to manage the quantity of material typically produced, and products of the processing have been effectively marketed.
- **Operational Excellence** - optimizing the operations of the Authority's solid waste management assets as well as the programs that will be administered by the Authority.
- **Harmonization of Services County-wide** – aligning the services, programs, and facilities for a unified services across the Authority.
- **Best Value Service** – developing services, programs, and facilities that reflect local and regional conditions and that the value of service is appropriately balanced with the cost of service and with a direct correlation between those that receive the benefits and those that pay for the services.
- **Control Your Solid Waste Management Destiny** – developing the services, programs, and facilities such that the Authority takes responsibility for managing the solid waste generated in the County and the outcomes of the decisions.

The SCS Team will facilitate a discussion with the Authority's Executive Committee to explore the guiding principles presented above and any others suggested during the discussion.

KEY POLICIES

The need for key policies decisions by the Executive Committee to guide the Master Plan was also discussed at the Project Kick-Off Meeting. Like the guiding principles, establishing policy direction early in the master planning process will also provide clarity in terms of the Authority strategic direction. The following key policies are presented below in no particular order for consideration:

- Does the Master Plan assume a 40 year planning horizon and should the timeframe also consider the time associates with implementation of the recommended services, programs, and facilities?
- Should waste generated by the Authority membership only be considered?
- Does the Authority want to consider options to dispose of waste generated by the Authority membership outside of the County?
- Does the Authority want to maximize the use of existing infrastructure within Broward County?
- Are there specific services, programs, and facilities (including specific technologies) to exclude from consideration?
- How should the Master Plan align with the County's Disaster Debris Management Plan?
- Is there a ceiling on the annual assessment levied for the Authority's System?
- Is there a minimum distance from solid waste facilities to residential properties?
- Are there specific environmental justice considerations to apply to the development of the Master Plan?
- Should the Authority consider mandatory residential and commercial recycling?

The SCS Team will facilitate a discussion with the Authority's Executive Committee to explore the key policies presented above and any others suggested during the discussion.

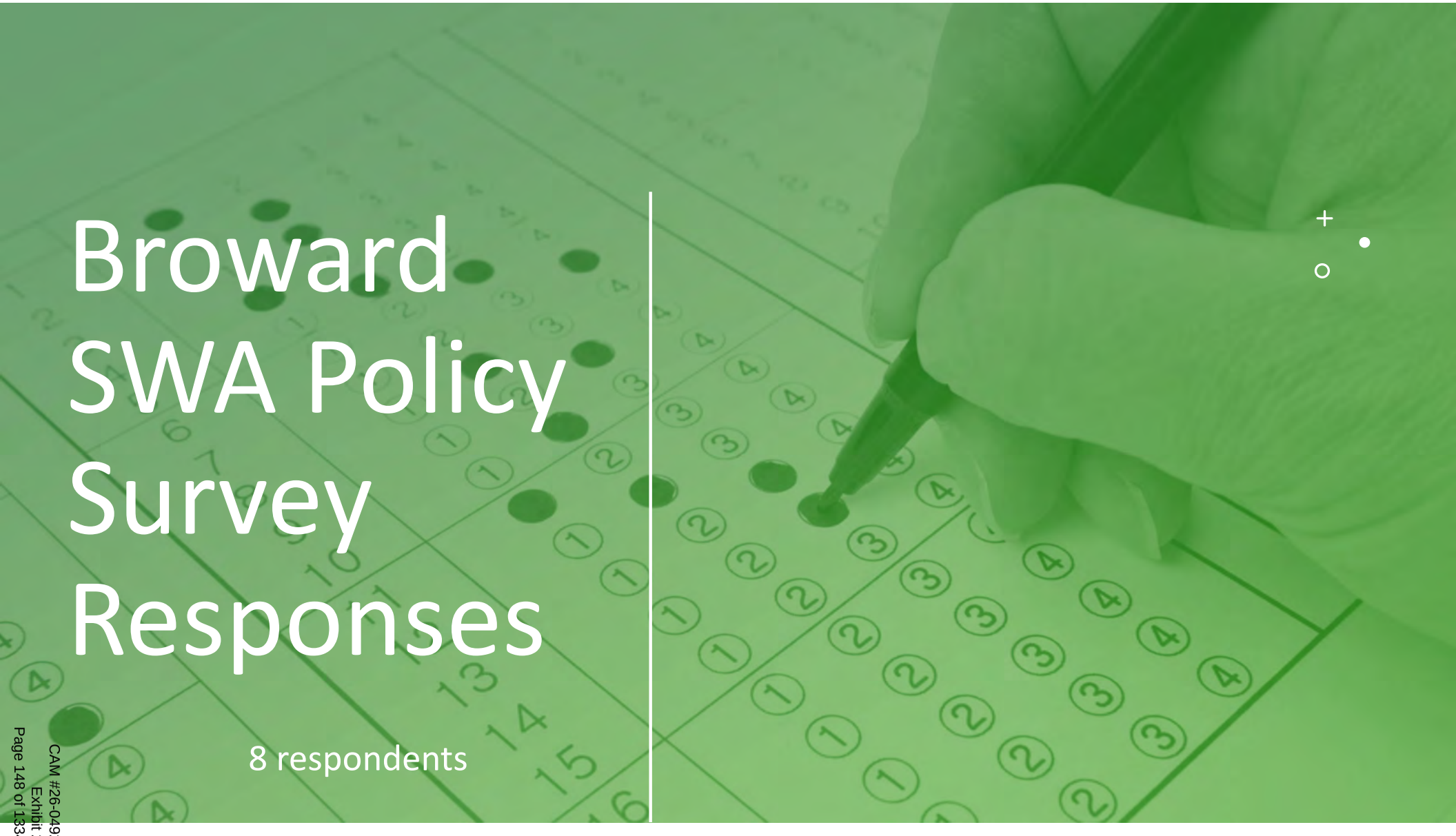
SUMMARY

The framework presented herein identifies key aspects of the original Broward County Resource Recovery System, subsequent activities of the SWWG, the goals of the new Authority, and the data and policy direction required to support the professional services that will be performed by the SCS Team to aid the Authority to realize their goals, including the development an integrated and sustainable System that will enable the Authority to meet or exceed the State's 75% recycling goal. As this framework aims to align our activities with the Authority's expectations, it will be included in the SCS Team's project management plan that reflects our scope of services and other contractual commitments.

Appendix C

Key Policy Survey Presentation

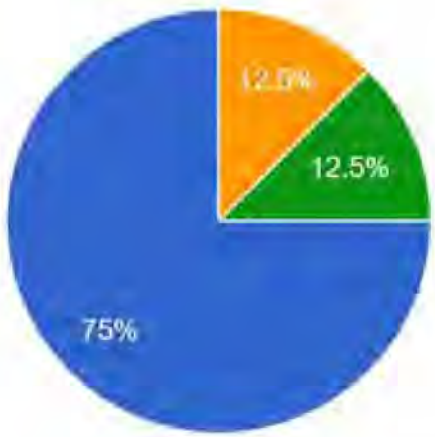
Broward SWA Policy Survey Responses

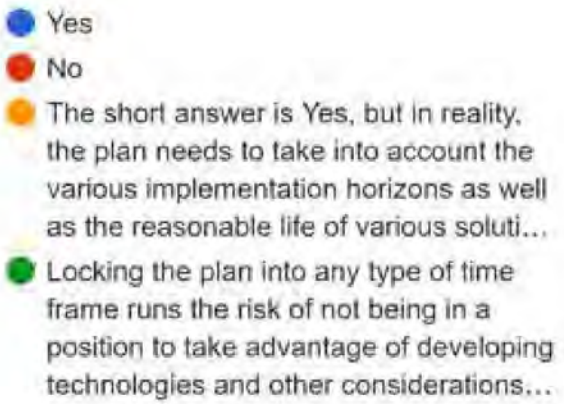


8 respondents

The Master Plan contemplates a 40-year planning horizon. Should the timeframe also consider extensions and amendments depending on specific ...sions, and time associated with implementation.

8 responses





Question: Timeline of The Master Plan

Answers - Timeline of The Master Plan

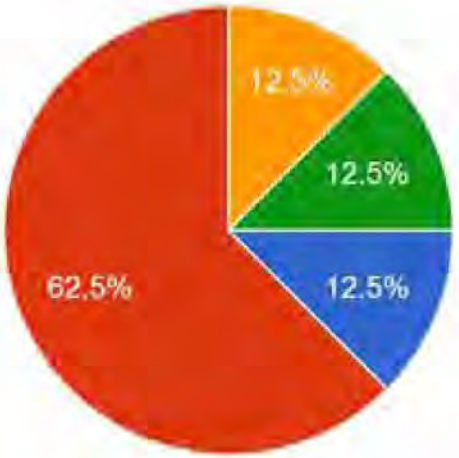
6 respondents answered yes that the timeframe should consider extensions and amendments

"The short answer is Yes, but in reality, the plan needs to take into account the various implementation horizons as well as the reasonable life of various solutions."

"Locking the plan into any type of time frame runs the risk of not being in a position to take advantage of developing technologies and other considerations, economic or otherwise. While the plan needs goals and timeframes, it is also important to consider the realities of county, state, and world events that impact--for better or worse--the status of the plan."

Should only waste generated by the Authority membership be considered? Or should the opportunity be given to those municipalities that chose not to joi...unicipalities not currently a part of the Authority.

8 responses



- Yes, only waste generated by the Authority should be considered.
- No, opportunity should be given to those municipalities that chose not to join if they contribute an equitable amount to...
- Yes, only waste generated by the Authority should be considered, but if their request is for infrequent or rare u...
- These are 2 different questions. (1) One is should we consider waste from non-...

Question: Should only municipalities in the Authority be included?

Answers: Should only municipalities in the Authority be included?

"No, opportunity should be given to those municipalities that chose not to join if they contribute an equitable amount to those members that joined when the Authority was established." (5 respondents)

"Yes, only waste generated by the Authority should be considered." (2 respondents)

"These are 2 different questions. (1) One is should we consider waste from non-members -- I would need more information as to the considerations.. we should consider utilizing waste flows if necessary for economies of scale.

(2) The second question is should they be able to join the authority as a member later. That is also complicated by timing, economic considerations, flow issues and benefits/consequences to the Authority and what equitable means. Obviously, the decision should be equitable to the existing members but what that means is very complicated. In short, neither question lends themselves to a yes, or no, or a full understanding of the issues to consider. "

Does the Authority want to consider disposal options of waste generated by the Authority membership outside of Broward County? Please choo...tions you feel need to be a part of the process.

8 responses

Question: Disposal Options for Outside of Broward County?

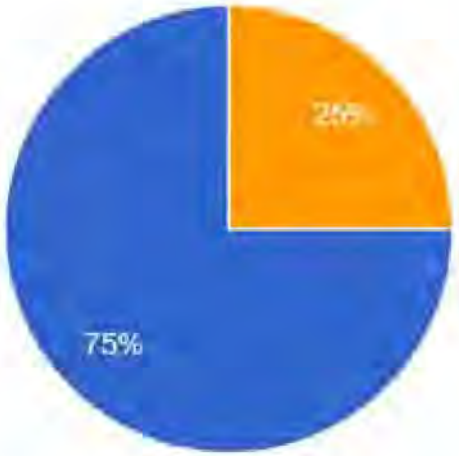
Answers: Disposal Options for Outside of Broward County?

7 respondents said Yes

1 respondent said: "It depends on capacity, costs, carbon footprint costs, and the ability to process the flow in the county. Obviously, all options must be considered to make sure we are considering a regional approach as well as addressing the issues of capacity in Broward."

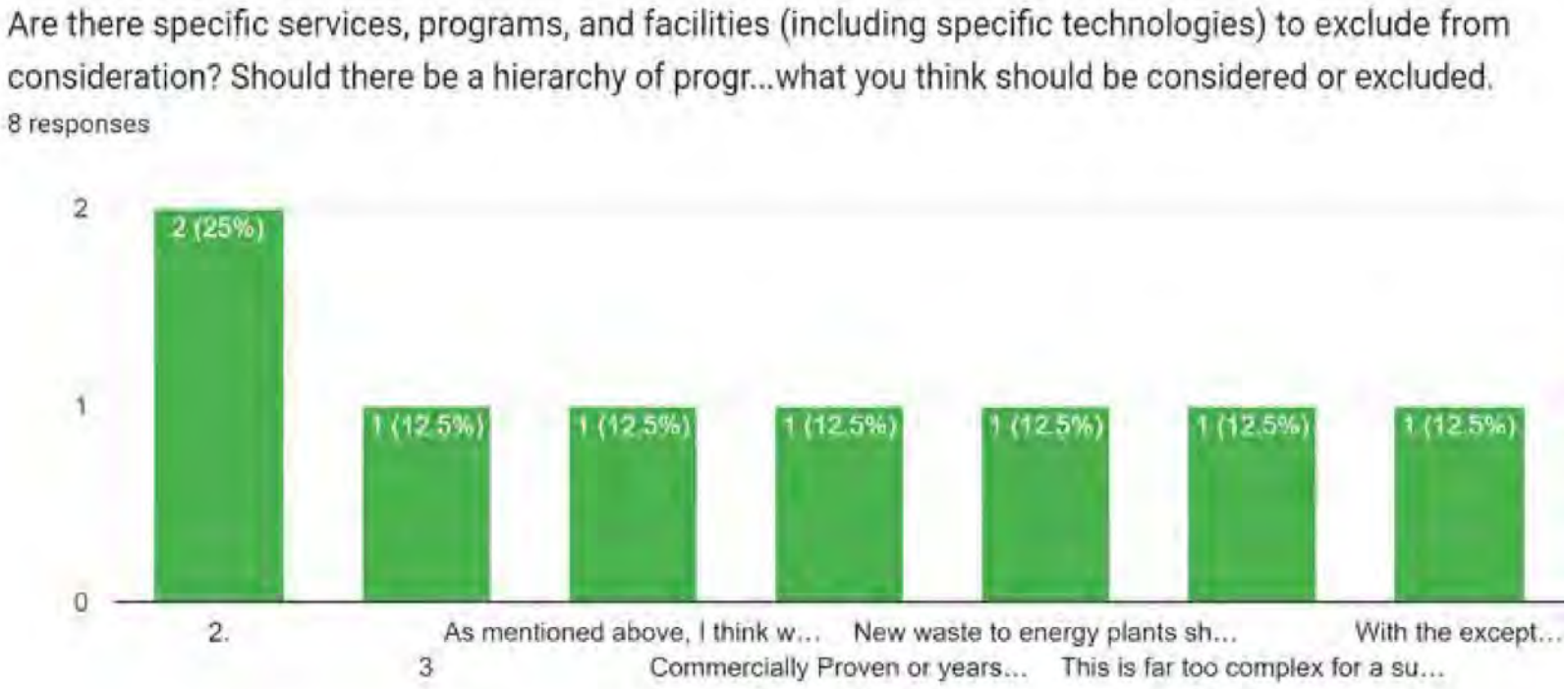
Does the Authority want to maximize the use of existing infrastructure within the County? The Master Plan will incorporate modeling of future gro...w capacity and current and future infrastructure.]

8 responses



- Yes, maximize what the use of existing infrastructure we have while allowing for growth. There may be infrastructure that will need to be closed in favor of new i...
- No, let us focus on the new infrastructure we need and a plan for closing or shutting down existing infrastructure.
- Yes, maximize what we have while allowing for growth. No facilities should be shuttered as a part of this process.

Question/Answers: Maximize existing infrastructure?



Question: Are there specific services, programs, and facilities (including specific technologies) to exclude from consideration?

Answers, Part I: Are there specific services, programs, and facilities (including specific technologies) to exclude from consideration?

New waste to energy plants should be excluded. The current plant may be needed on a transitional basis. For food waste, a composting option should be included. For vegetative waste, a partnership with farmers in the Okechobee region could be an exceptional option. They need this debris to replenish their top soil. It is key that we separate C&D debris from other debris so that it can truly be recycled.

No, all should be considered if there is a positive cost/benefit ratio. (2 respondents)

No, all should be considered. Or please let us know your thoughts on a hierarchy of services, programs, and facilities, or what you think should be considered or excluded.

Answers, Part II: Are there specific services, programs, and facilities (including specific technologies) to exclude from consideration?

We should remove from consideration those strategies that are not politically, economically, socially, and environmentally acceptable WHILE making sure move forward with existing assets rapidly to address waste streams which can be addressed and provide great benefit to the goals of the Authority -- rather than waiting for adoption of a Master Plan.

As mentioned, I think we do a disservice by being too rigid and inflexible. Tomorrow's technology may place today's in obsolescence. The goal should be service to the communities in a manner that provides a sustainable cost/benefit ratio and includes environmental considerations.

Commercially Proven or years of testing we can go see

With the exception of adding an additional WTE Facility, all should be considered if there is a positive cost/benefit ratio.

How should the Master Plan align with the County's Disaster Debris Management Plan? Please choose yes or no or Other and type in an answer to ... these two plans should or should not be aligned.

8 responses

Question: How should the Master Plan align with the County's Disaster Debris Management Plan?

Answers: How should the Master Plan align with the County's Disaster Debris Management Plan?

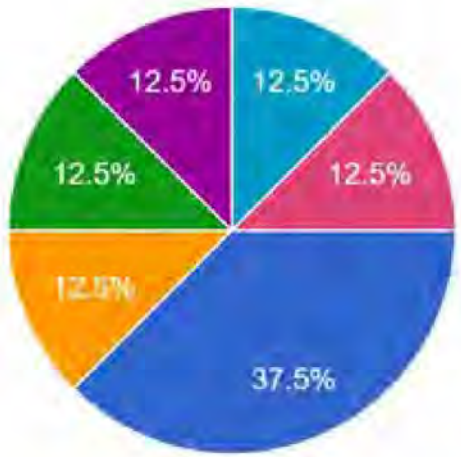
- 4 respondents: Yes, they should align
- Yes: "Certainly should be considered. However, that is outside of our scope. But any way that we can be in alignment, would be a positive addition."
- "There obviously must be a consideration, but the Disaster Debris Management Plan should not eclipse considerations automatically or reflexively, especially where there are options."
- "No position can be provided as the County's DDMP since this has not been discussed. However, the County's TDMS ILA should be included with additional TDMS locations made available to all members, and a final disposal location identified for member use."

Question: Is there a ceiling on the annual assessment levied for the Authority's solid waste management system?

- "The key is that it is competitive with other options that are available to municipalities. If it gets out of line, members will drop out and the plan will ultimately be a failure."
- "We have to meet the needs of the systems."
- Don't understand this question
- "This is impossible to answer in a survey. When? Over what period of time? Does the strategic plan have wide-spread consensus? That being said, there must be due consideration to ensuring there is fiscal responsibility and the assessments do not become unattainable or feasible for budgets."
- "Any amount charged will be too much for some of the population. A plan that recovers/reuses as much as possible and that converts that which can be converted into energy, compost, or recyclable material should be expected."
- "Phased approach increases needed over 5 years to get rate up."
- "The ceiling amount should be determined by the board."
- "Yes, there should be a ceiling on the annual assessment."

Should other types of fees be considered in addition to the annual assessment (e.g. millage on property tax, increased disposal fees, sales tax add... additional types of fees should not be considered.

8 responses



- Yes
- No
- Initially, all options should be reviewed
- Even if expected to be rejected, other fee structures should be analyzed to e...
- Residents have a right to know what is being spent to handle waste. Hidden f...
- Per ton tip fee on all MSW disposed including WTE
- : Based on the Governing Structure ch...

Question: Should other types of fees be considered in addition to the annual assessment?

3 respondents: Yes

Yes: “Initially, all options should be reviewed”

“Even if expected to be rejected, other fee structures should be analyzed to ensure this is a comprehensive analysis.”

“Residents have a right to know what is being spent to handle waste. Hidden fees mask that number. There should be an assessment that delineates the amount spent for this service.”

“Per ton tip fee on all MSW disposed including WTE.”

“Based on the Governing Structure choice of an ILA, there are certain restrictions in which fees can be applied…however, the County and City can also apply fees that would support funding the system.”

Answers: Should other types of fees be considered in addition to the annual assessment?

Question: Should there be a minimum distance from residential properties to solid waste facilities?

Answers: Should there be a minimum distance from residential properties to solid waste facilities?

3 respondents: Yes, there should be a safe minimum distance for any new solid waste processing facilities to residential properties.

"Environmental planning standard"

"This question is not specific enough."

"Yes, and more so depending on the type of facility. One size may not fit all strategies currently or in the future with the development of new technology."

"The market will make this determination. There will be people who will not purchase near a disposal site no matter the discount while others gladly will."

"Depends on the type of facility, as well as State and Federal guidelines."

A conscientiously developed Master Plan uses the latest standards and technologies for recycling will incorporate sound principles of disposal as wel...ts to ensure they are included and complied with.]

8 responses

Question: A conscientiously developed Master Plan uses the latest standards and technologies for recycling will incorporate sound principles of disposal as well as specific environmental justice considerations such as air emissions, quality of air, etc.… , which would make the County a state leader on environmental justice. Do you agree?

Answers: A conscientiously developed Master Plan uses the latest standards and technologies for recycling will incorporate sound principles of disposal as well as specific environmental justice considerations such as air emissions, quality of air, etc.… , which would make the County a state leader on environmental justice. Do you agree?

4 respondents : Yes

"More information would be needed"

"Depends on the type of facility, as well as State and Federal guidelines."

"There should not be a requirement for residents to pay more for Environmental Justice."

"First, it would not make the County a leader ... it would make the Solid Waste Authority a leader with the cooperation of the County and all participating municipalities. It is difficult to answer this question yes or no, where "etc." is included and then invites consideration of payment for analysis. We must take into consideration the issues of air emissions, air quality, quality of life issues, proximity to environmental priorities, impacts on residential areas, traffic, carbon footprint, economic considerations for disposal and collection, and many other issues. We would need to flush out what it means to pay or pay more and for what."

"The market will make this determination. There will be people who will not purchase near a disposal site no matter the discount while others gladly will."

We are all in this together, but if there is not consistent programming and services across the Authority members, the trajectory of materials mana...d the specific materials that should be included.

8 responses

Question: Should the Authority consider mandatory recycling of a set list of materials (e.g., paper, cardboard, metal, plastic, glass, yard trash, organics, construction and demolition debris)?

Answers: Should the Authority consider mandatory recycling of a set list of materials (e.g., paper, cardboard, metal, plastic, glass, yard trash, organics, construction and demolition debris)?

4 respondents: Yes, there should be mandatory residential and commercial recycling throughout the county including yard trash, organics, and construction and demolition debris.

"This is a municipal decision- not sure it's appropriate for the authority to dictate."

No, residential and commercial recycling should not be mandatory.

"My initial reaction to the question is there should be mandatory participation in programs in order to maximize flow, ensure efficiencies of collection and disposal, avert Swiss cheese participation or patchwork expectations and inconsistent educational efforts. However, without further discussion to understand if there are any models that differ from this broad principle or considerations for individual waste streams, it is possible that the answer could be refined."

"Mandating anything implies setting up an enforcement agency, otherwise, we have just made another law for people to ignore. Does the authority want to establish a "trash/recycling police"? Personally, I would like to see every piece of trash get recycled in some form but if there is no market for the recycled material we haven't accomplished much. We should encourage and make possible recycling and even support it to a degree, but ultimately, the market will decide on its usability."

Appendix D

Residential Survey Results Presentation

Broward County

2024 Residential Survey

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Exhibit 2
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County Demographics

English-Speaking Respondents

CAM #26-0492
Exhibit 2
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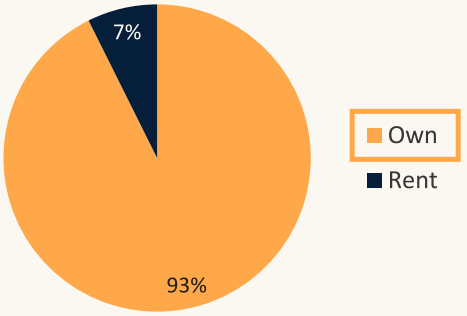
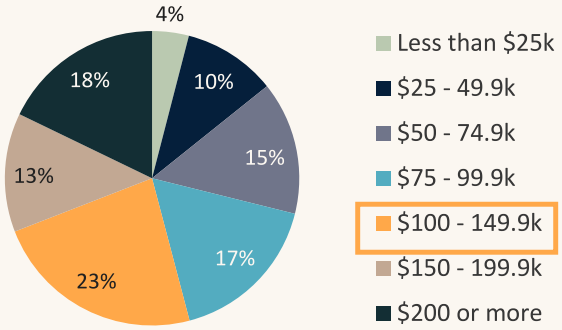
Broward County English-Speaking Respondent Demographics. n=2043

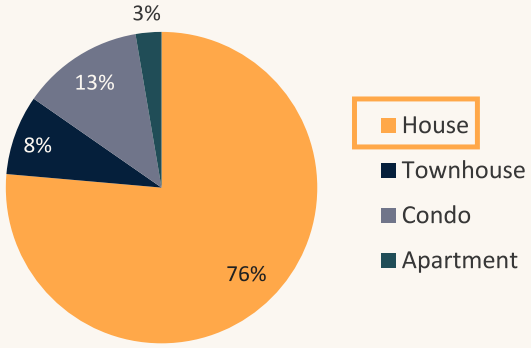
Rent/Own n=2025



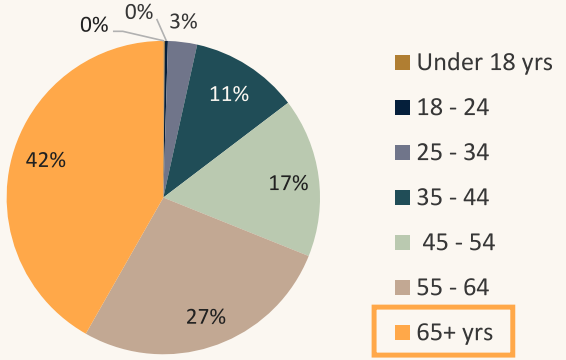
Income n=1340



Property Type n=2016



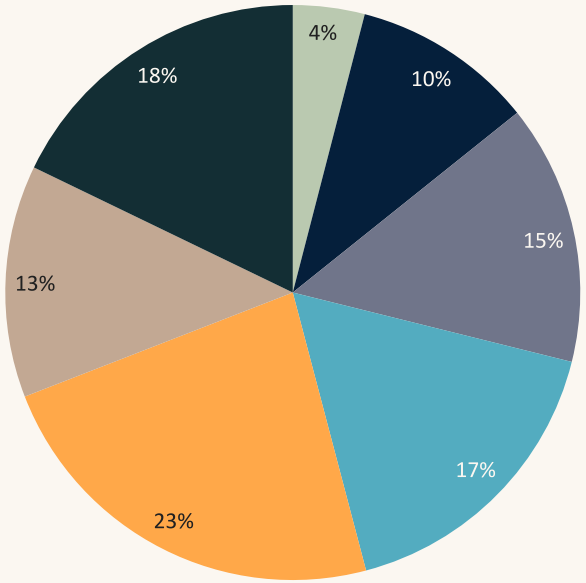
Age n=1930



Homeowners & those over 65 are overrepresented in survey responses.

Broward County English-Speaking Respondent Demographics. n=1340

Income n=1340



18.9% of respondents

46.6% of respondents

Nearly 50% of the survey respondents earn over $100,000 per year.

CAM #26-0492
Exhibit 2
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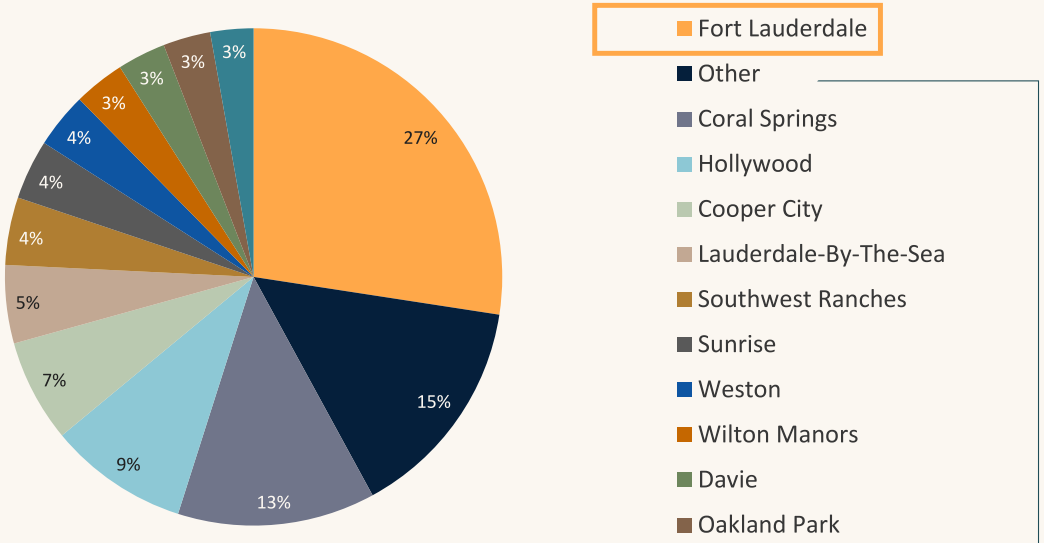
Broward County English-Speaking Respondent Demographics.

City n=1750



Cities represented by **2% or less** of respondents:

- Boulevard Gardens
- Broadview Park
- Coconut Creek
- Dania Beach
- Franklin Park
- Hillsboro Beach
- Lauderdale Lakes
- Lauderhill
- Lighthouse Point
- Margate
- Miramar
- North Lauderdale
- Parkland
- Pembroke Pines
- Pompano Beach
- Roosevelt Gardens
- Sea Ranch Lakes
- Tamarac
- Washington Park
- West Park

Respondents from Fort Lauderdale had higher survey participation and are therefore overrepresented in the results.

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Exhibit 2
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Survey Results

CAM #26-0492
Exhibit 2
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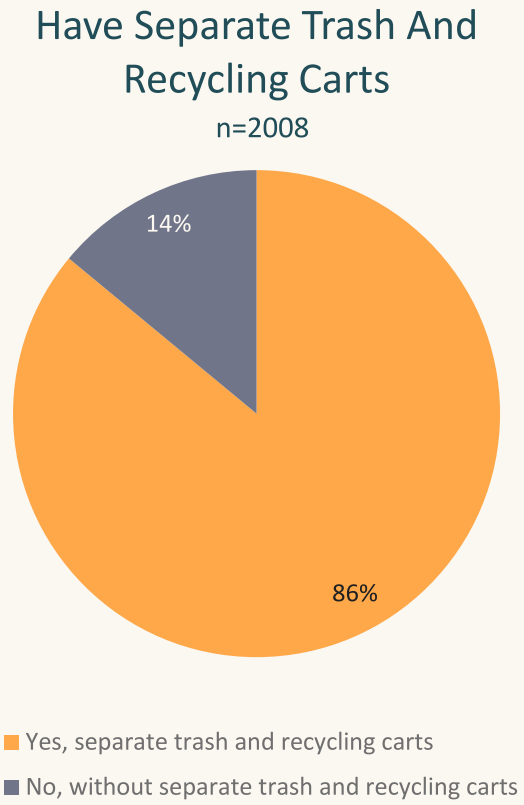

Separate Carts

22% of those who **rent** do not have separate carts. Renters are more likely to have dumpsters than carts.

Those who **live in a Townhouse, Condo,** or **Apartment** are more likely to say they **do not have separate carts** than those who live in a House.

Residents living in **Coconut Creek, Davie, Pembroke Pines,** and **Plantation** are more likely to say they **do not have separate carts**. Coconut Creek, Davie, and Pembroke Pines do not have recycling.

75% of those who **do not have separate carts** state they **live in a city that does not offer recycling**.

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Exhibit 2
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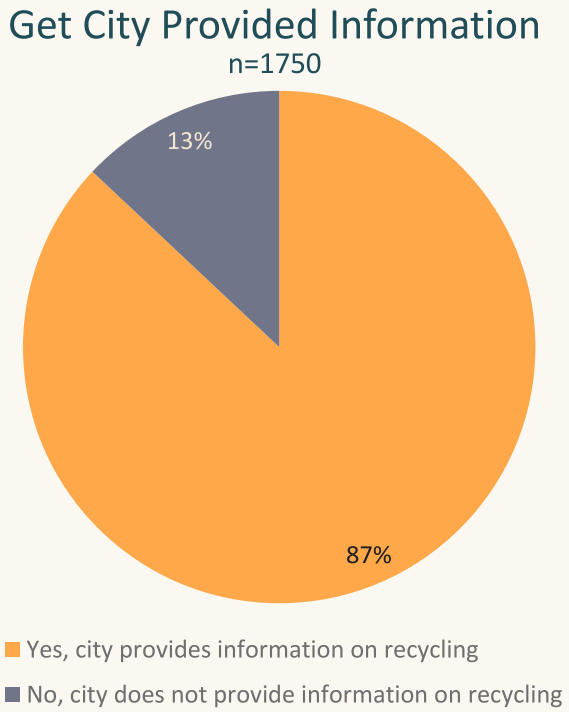

City-Provided Recycling Information

23% of 25–34 yr olds and **21% of 35–44 yr olds** state they **do not receive** recycling information from their city.

Those who **Rent** and who **live in a Townhouse, Condo,** or **Apartment** are more likely to say they **do not receive** recycling information from their city.

Residents living in **Dania Beach** and **Davie** are more likely to say they **do not receive** recycling information from their city. Dania Beach has curbside recycling, but Davie does not.

CAM #26-0492
Exhibit 2
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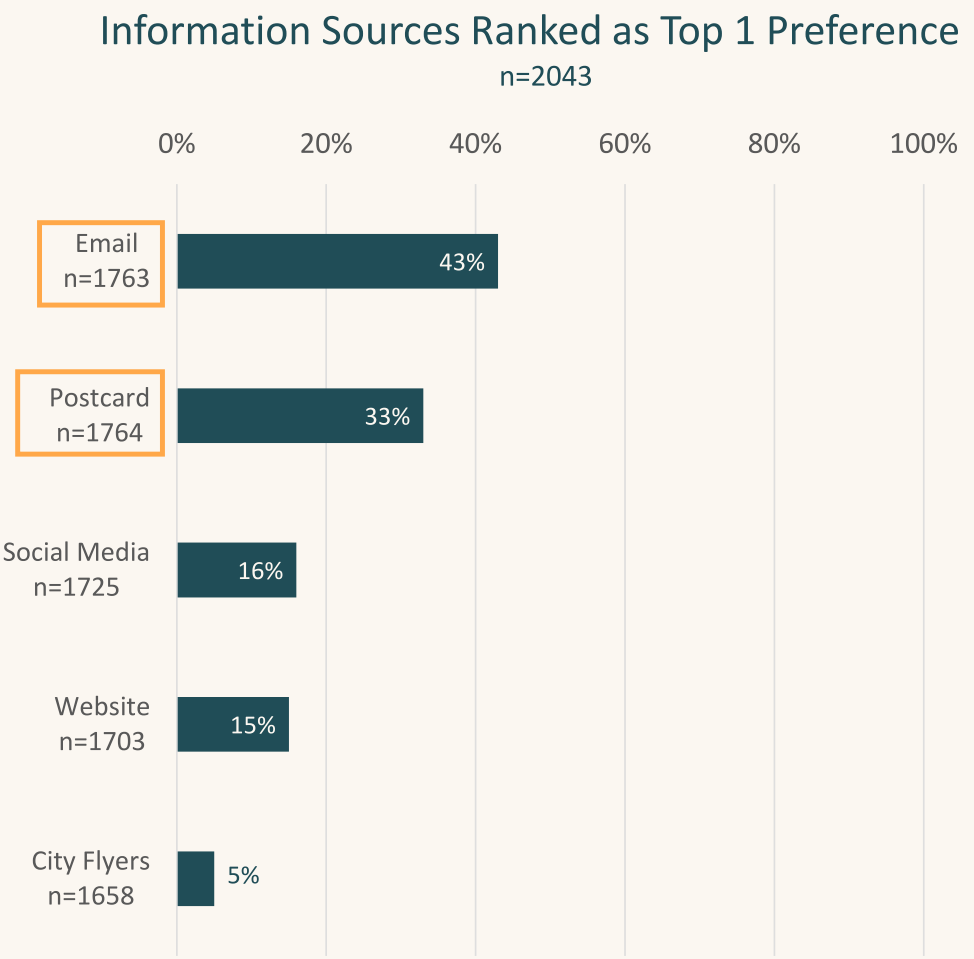
Information Source Preference

Email and Post Card stand out as the most preferred way to receive recycling information.

Communication Preferences by Age:

Under 18: Social Media
18 to 24: Post Card
25 to 34: Post Card
35 to 44: Post Card
45 to 54: Email or Post Card
55 to 64: Email
65+: Email



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CAM #26-0492
Exhibit 2
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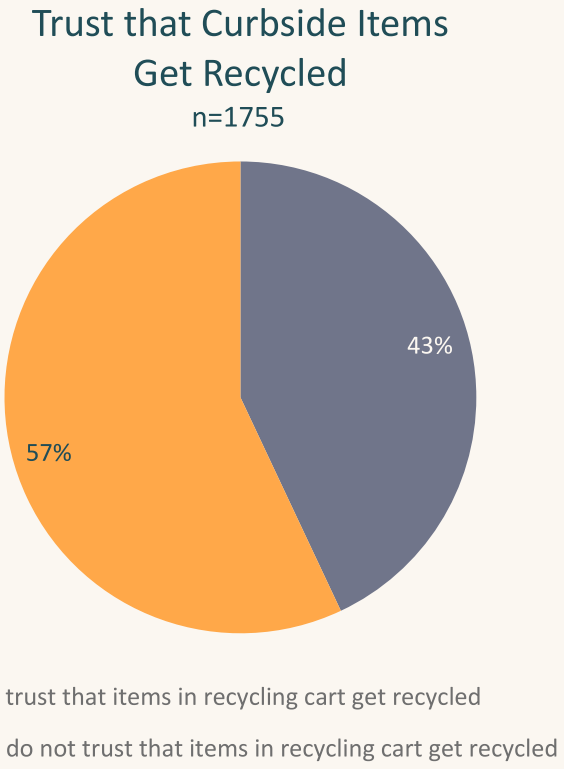
Trust in Curbside Recycling



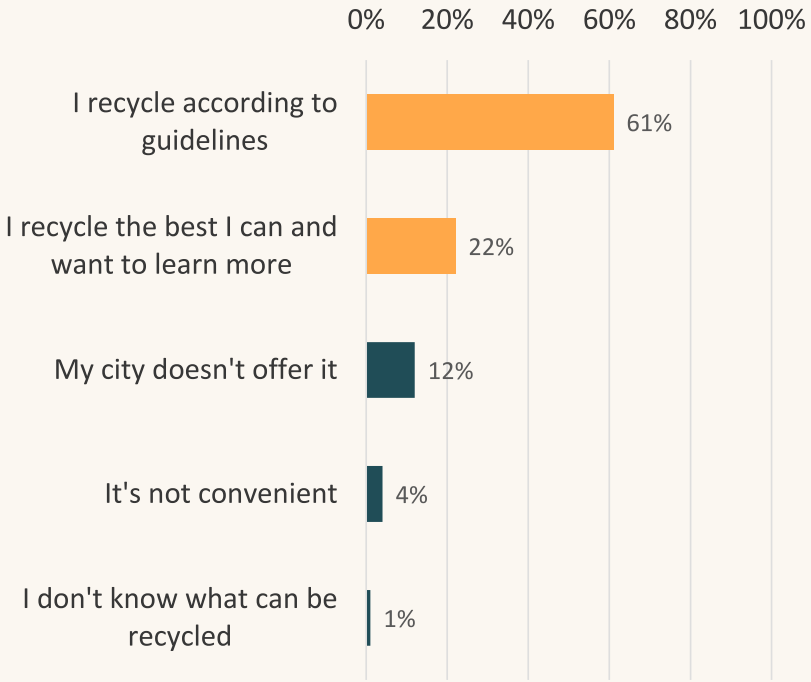
Of the 7% of Broward County residents who **rent**, **71% distrust** curbside recycling.

Those who **live in a Townhouse, Condo,** or **Apartment** are more likely to **distrust** curbside recycling.

Residents living in **Dania Beach, Davie, Fort Lauderdale,** and **Pembroke Pines** are more likely to **distrust** curbside recycling. Dania beach and Ft. Lauderdale have curbside recycling. Davie and Pembroke Pines do not.

What's stopping you from recycling?

n=2009



83% of survey respondents report recycling.

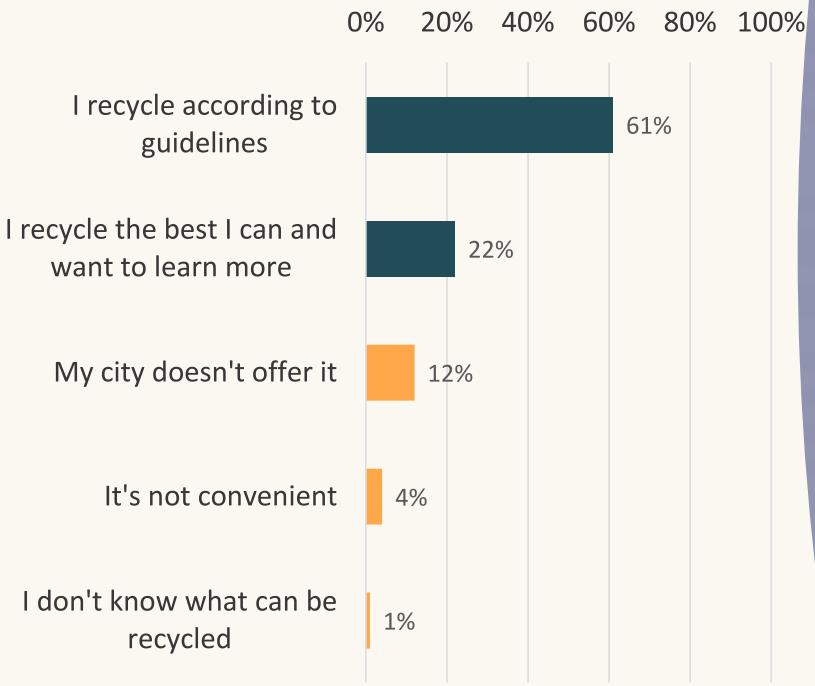
52% of those who **recycle according to guidelines** distrust curbside recycling. 18-44 yr old are more likely to want to learn more.

94% of those who responded they **recycle according to guidelines** and **77%** who responded they **recycle and want to learn more** receive recycling information from their city.

Those living in **Coral Springs, Fort Lauderdale,** and **Hollywood** are more likely to say they **recycle**.

What's stopping you from recycling?

n=2009



17% of survey respondents report not recycling.

65% of those who say recycling is **not convenient, have separate carts** for trash and recycling.

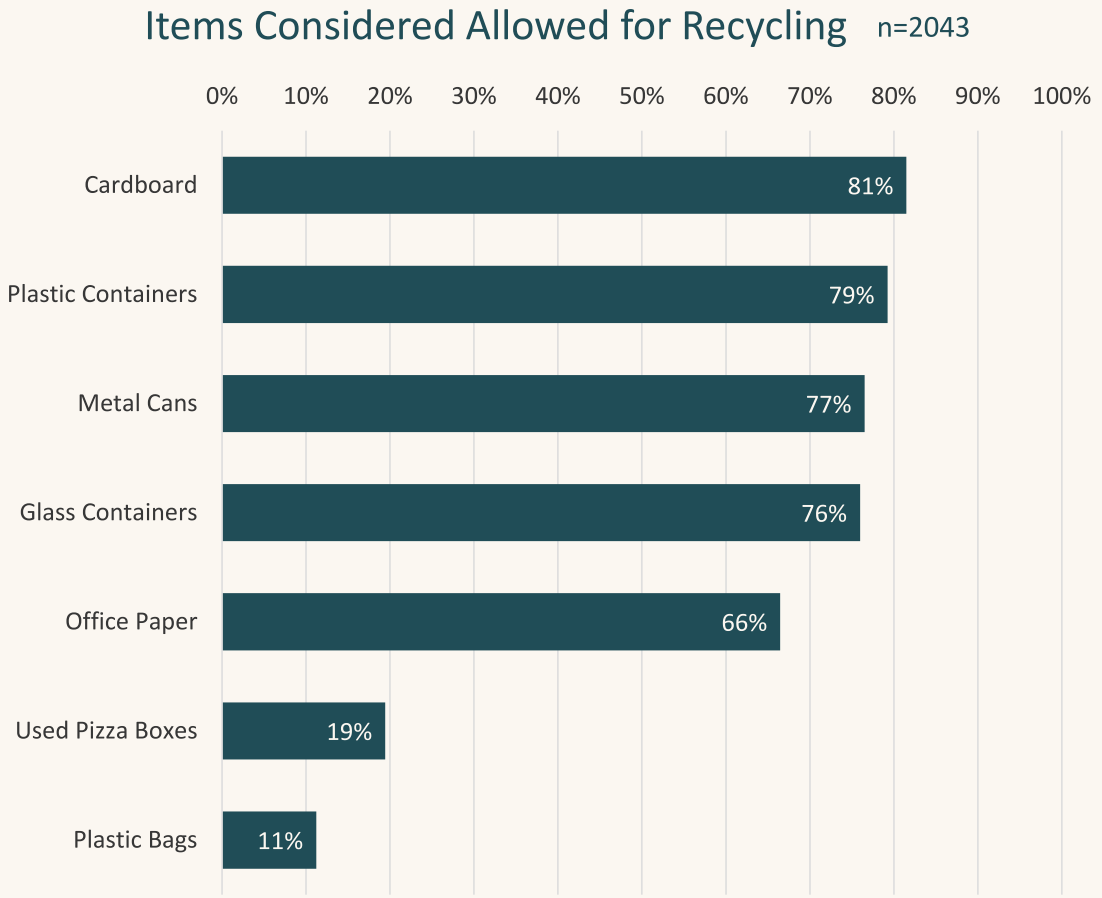
Renters are twice as likely to say that recycling is **not convenient.**

Residents living in **Davie** are much **more likely** to state that their city **does not offer recycling**. Davie does not have curbside recycling.

Items Allowed in Recycling Cart

Most respondents considered **Cardboard, Plastic Container, Metal Cans, Glass Containers,** and **Office Paper acceptable** for recycling.

Most respondents **do not** consider **Used Pizza Boxes** and **Plastic Bags** recyclable.



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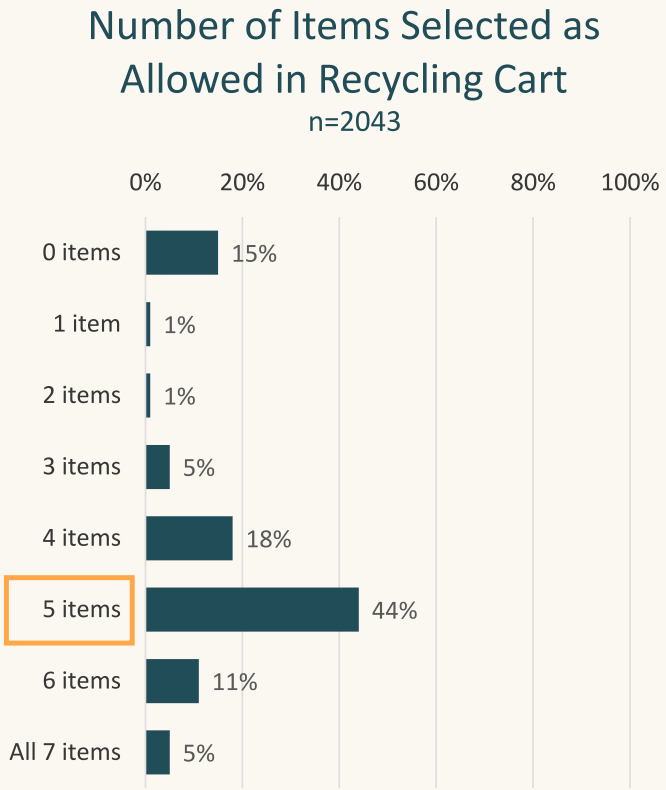
Items Allowed in Recycling Cart



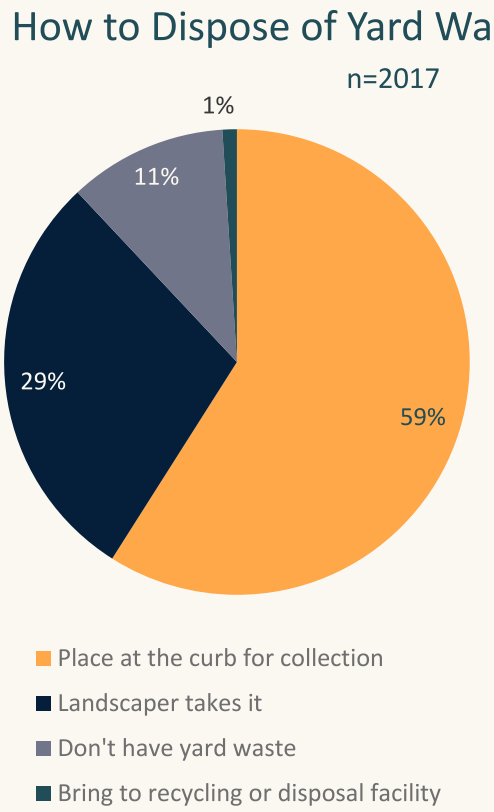
Specified items: metal cans, plastic containers, used pizza boxes, plastic grocery bags, glass containers, office paper, cardboard

Those **25 to 44 yrs old** are more likely to select **0 items or all 7 items** suggesting a misunderstanding of allowable items.

Those who make a **high income** or who live in a **House** are much more likely to select **4 or more items** from the list.

45% of Broward County respondents think **Pizza Boxes** fall within the allowable recyclable items list; **26%** think so for **Plastic Bags.**

Yard Waste Collection



Those making **less than $100k** are more likely **to not have yard waste**.

Those who **Rent** and who **live in a Townhouse, Condo,** or **Apartment** are more likely to **not have yard waste**.

Residents living in **Coral Springs, Fort Lauderdale,** and **Hollywood** are more likely to put their yard waste **at the curb** for collection.

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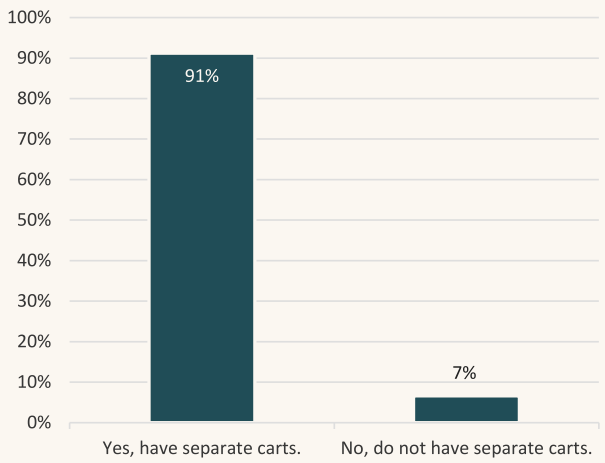
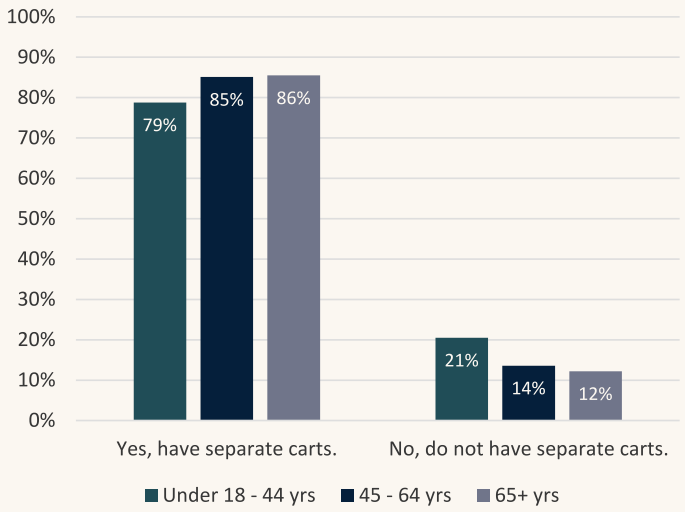
Separate Carts (n=2043)

Separate Carts by Zip Codes of Interest:
33069, 33023, 33309, 33311, 33313, 33319



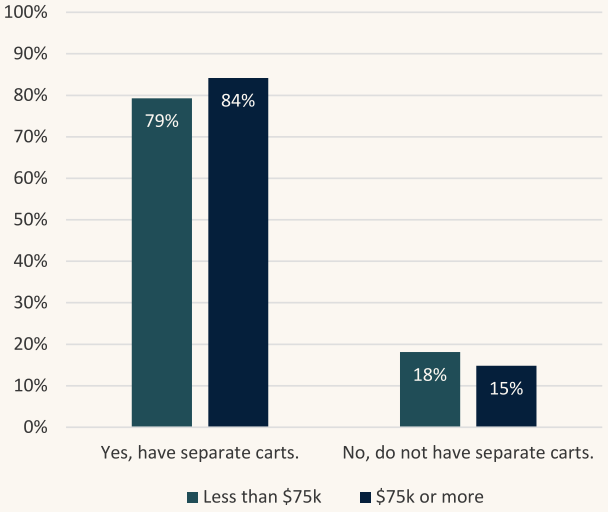
Most respondents residing in zip codes of interest have separate carts.

Separate Carts by Age Group



Ages 18-44 are slightly more likely to say they do not have separate carts.

Separate Carts by Income Level



No major differences between income groups.

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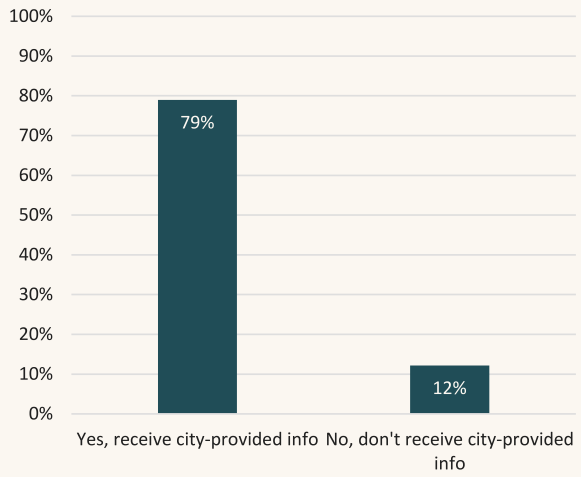
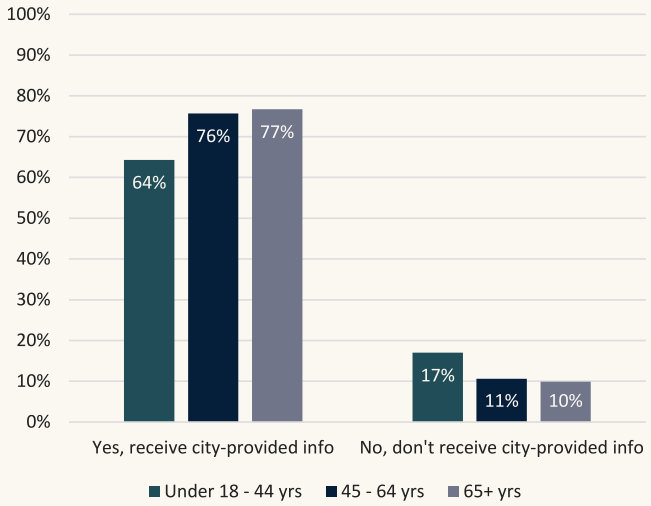
City-Provided Recycling Information (n=2043)

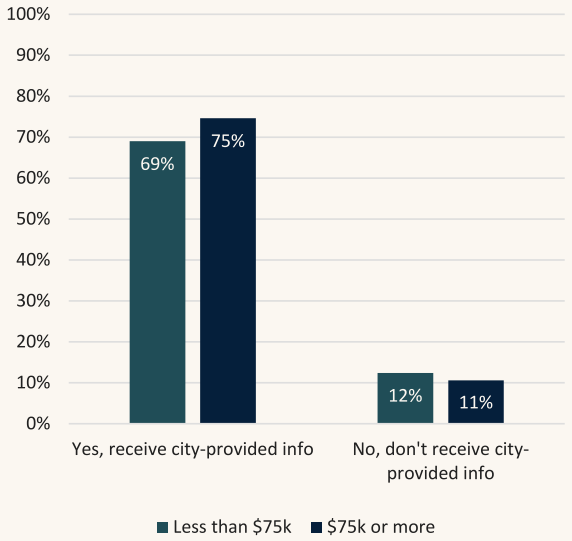
City-provided Info by Zip Codes of Interest: 33069, 33023, 33309, 33311, 33313, 33319



City-provided Information by Age Group



City-provided Information by Income Level



~¾ of those residing in zip codes of interest report receiving information.

Ages 18-44 are slightly more likely to say they do not receive information.

No major differences between income groups.

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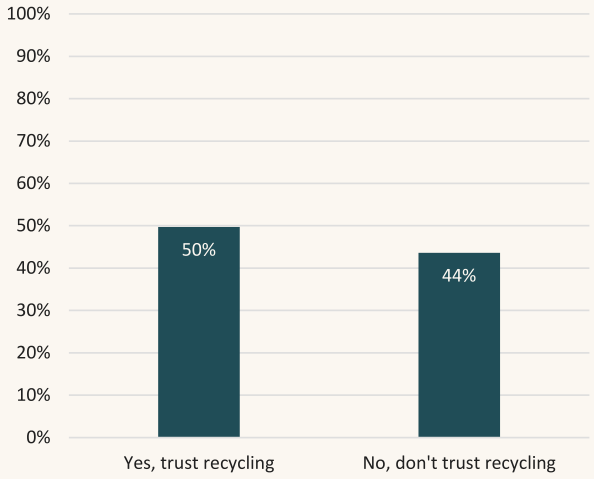
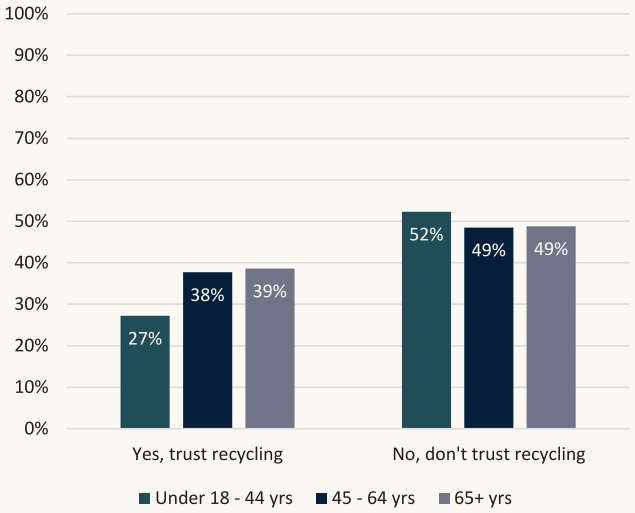
Trust in Recycling (n=2043)

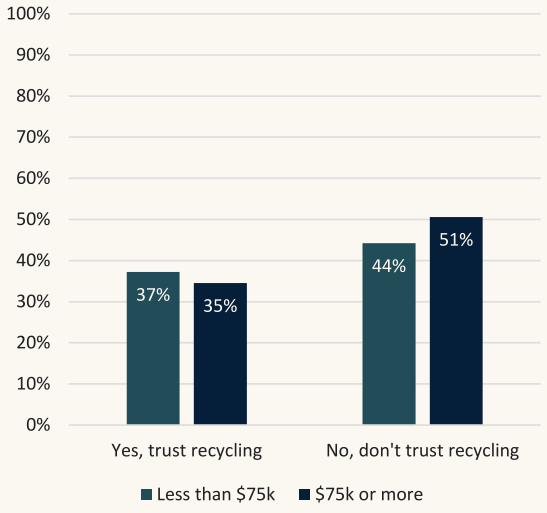
Trust in Recycling by Zip Codes of Interest: 33069, 33023, 33309, 33311, 33313, 33319



Trust in Recycling by Age Group



Trust in Recycling by Income Level



In zip codes of interest, trust in recycling is about 50-50.

Ages 18-44 are slightly more likely to distrust recycling.

Those making more than $75k are more likely to distrust recycling.

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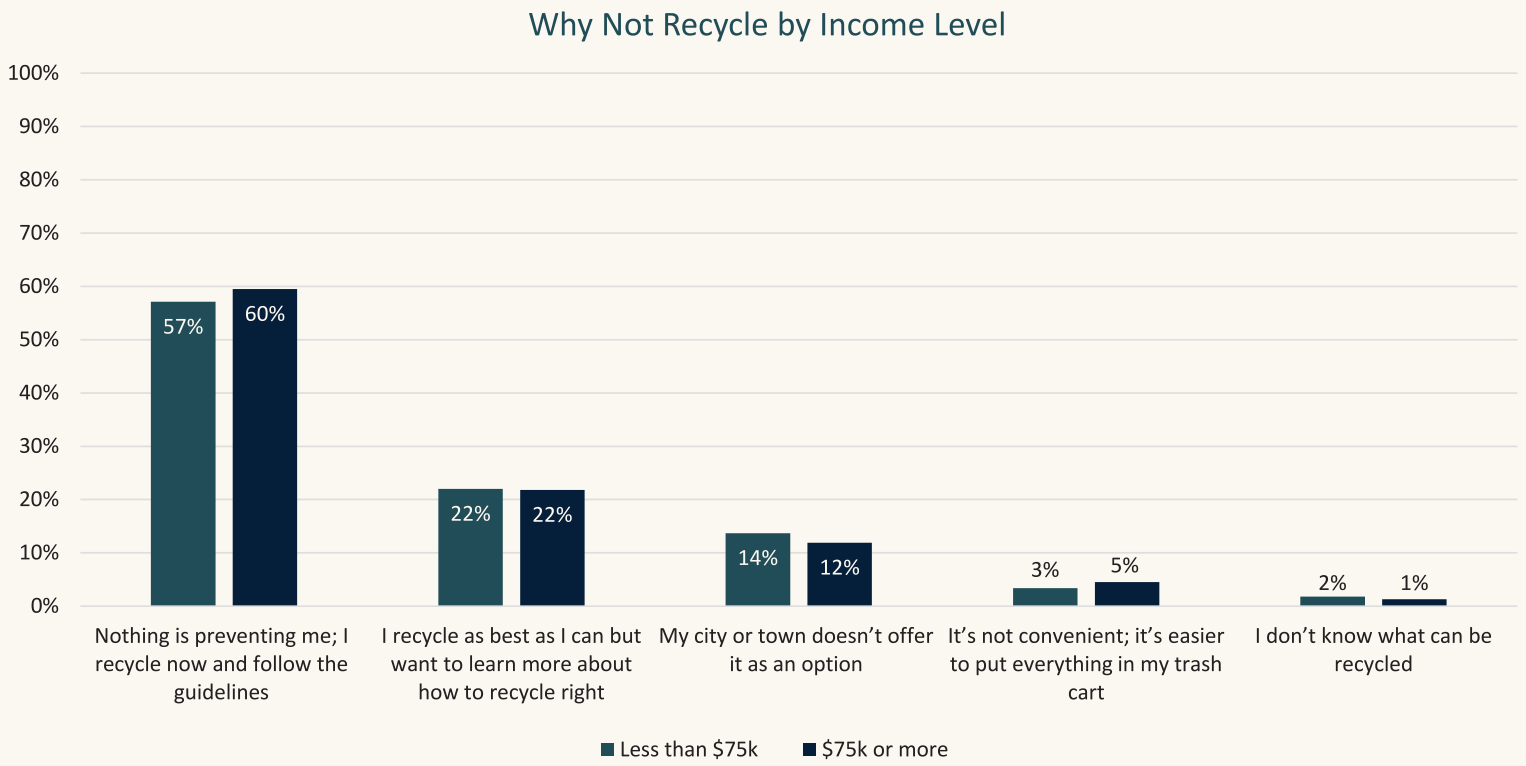
Why Not Recycle (n=2043)



No significant differences by income level

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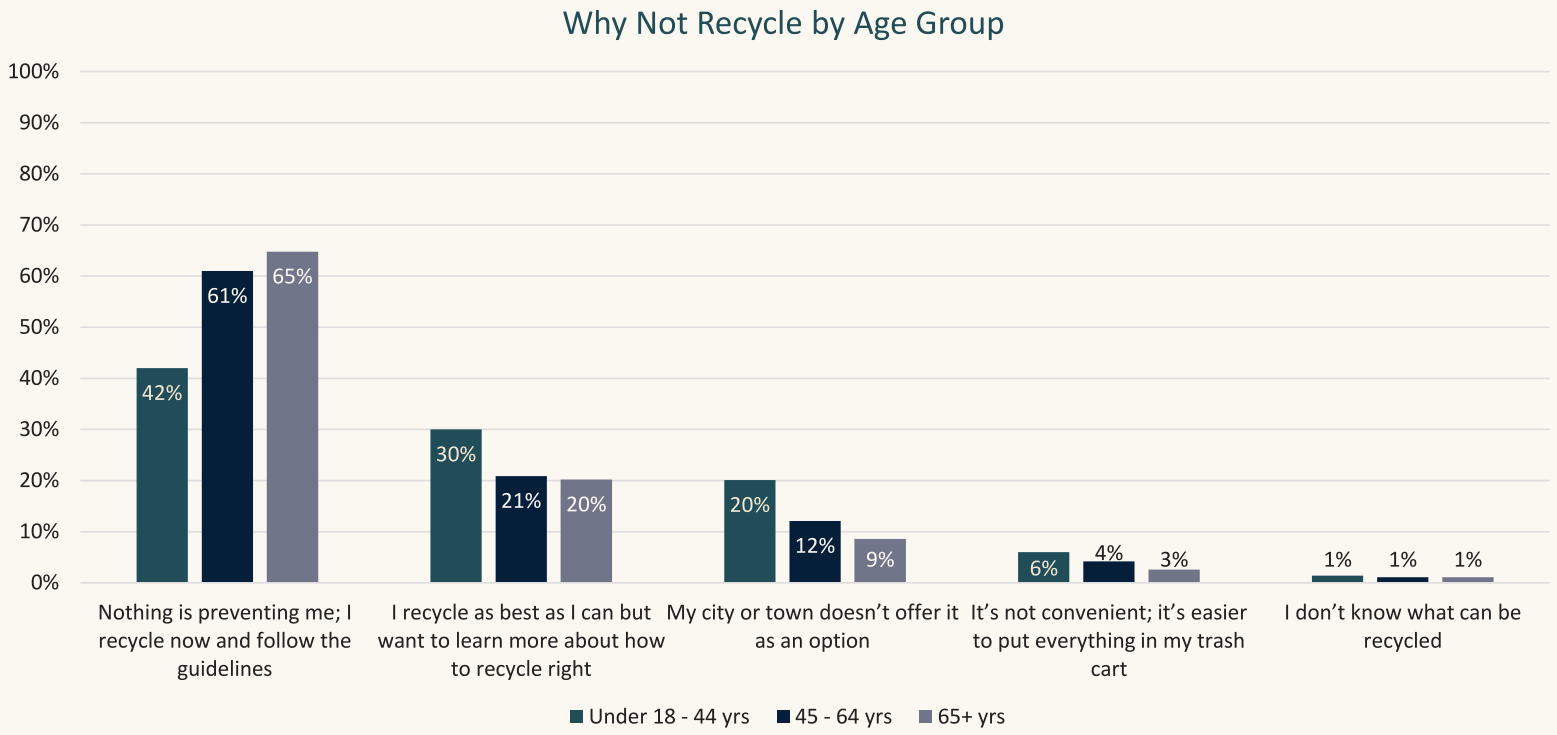
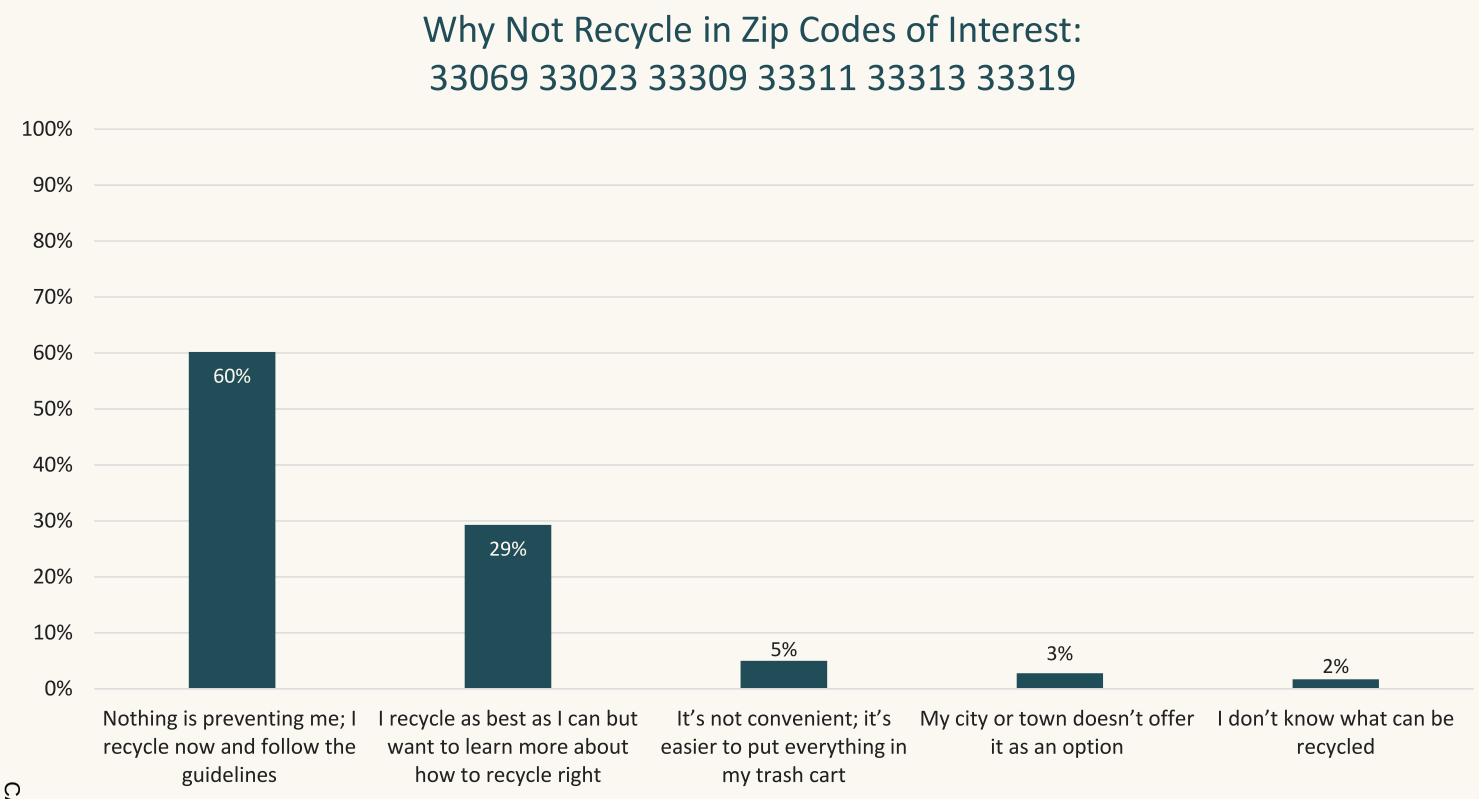
Why Not Recycle (n=2043)



Ages 18-44 are more less likely to recycle, and more likely to cite lack of access or convenience.

Ages 18-44 are also more likely to say they want to learn more about recycling.

Why Not Recycle (n=181)



89% of those in zip codes of interest recycle. Of those, 1/3 would like to learn more.

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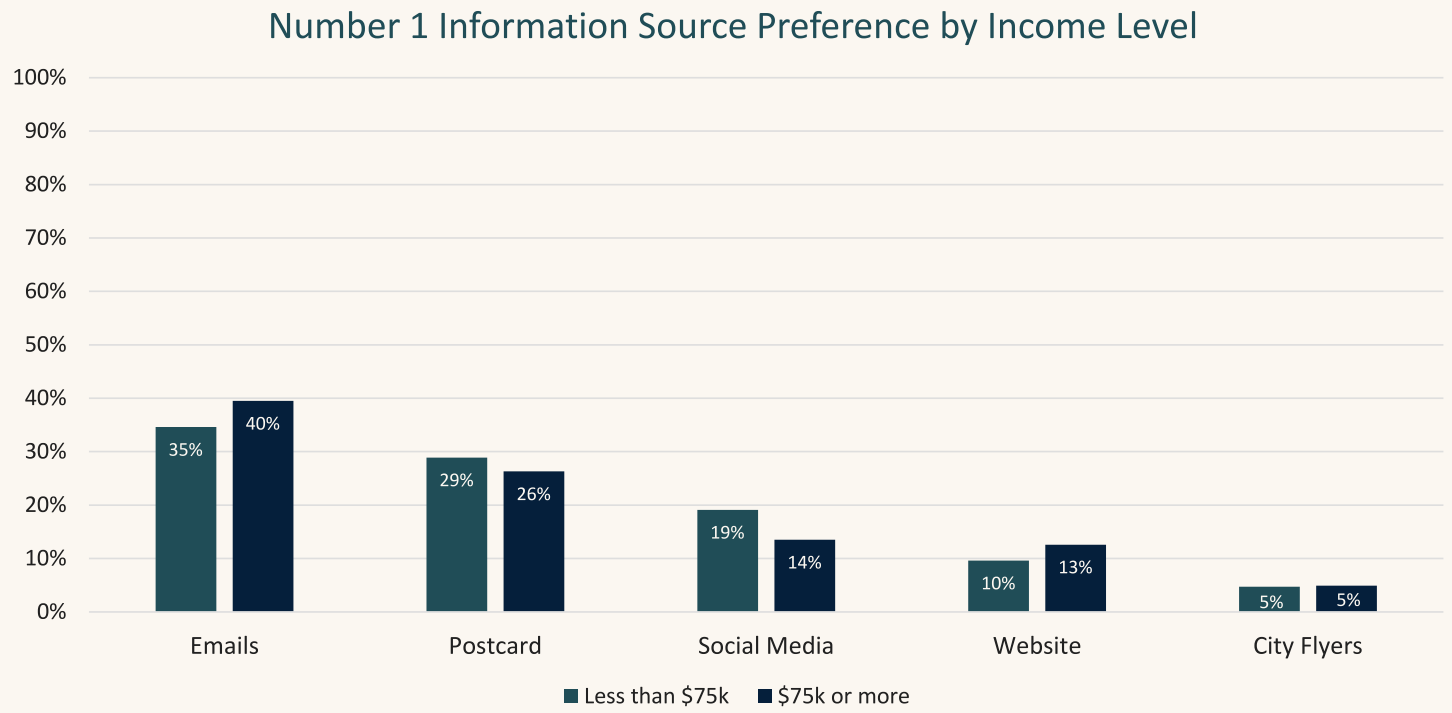
Information Source Preference (n=1340)



No significant differences by income level

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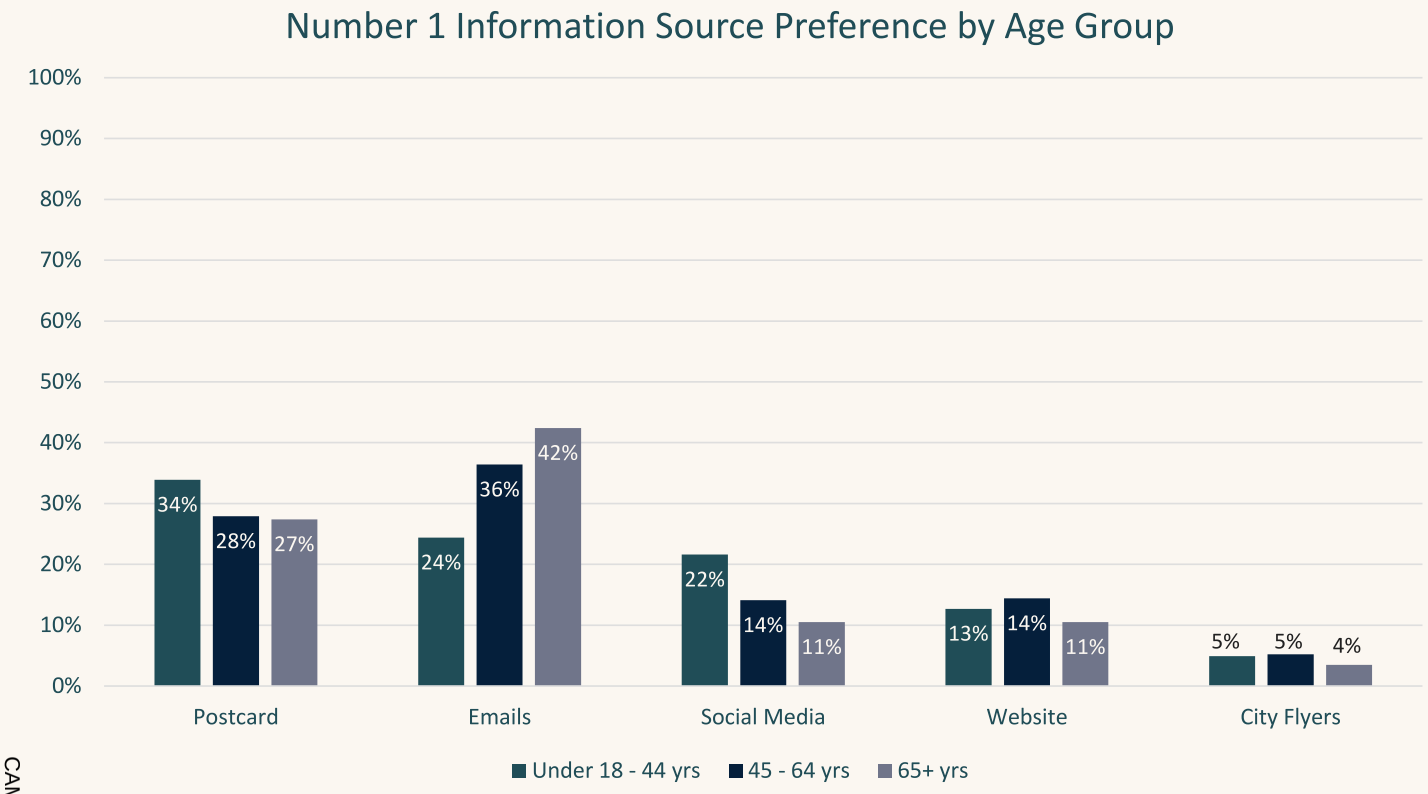
Information Source Preference (n=1930)



Ages 45+ are more likely to prefer emails, while under 45 prefer postcards.

Ages 18-44 are twice as likely to prefer social media compared to ages 65+.

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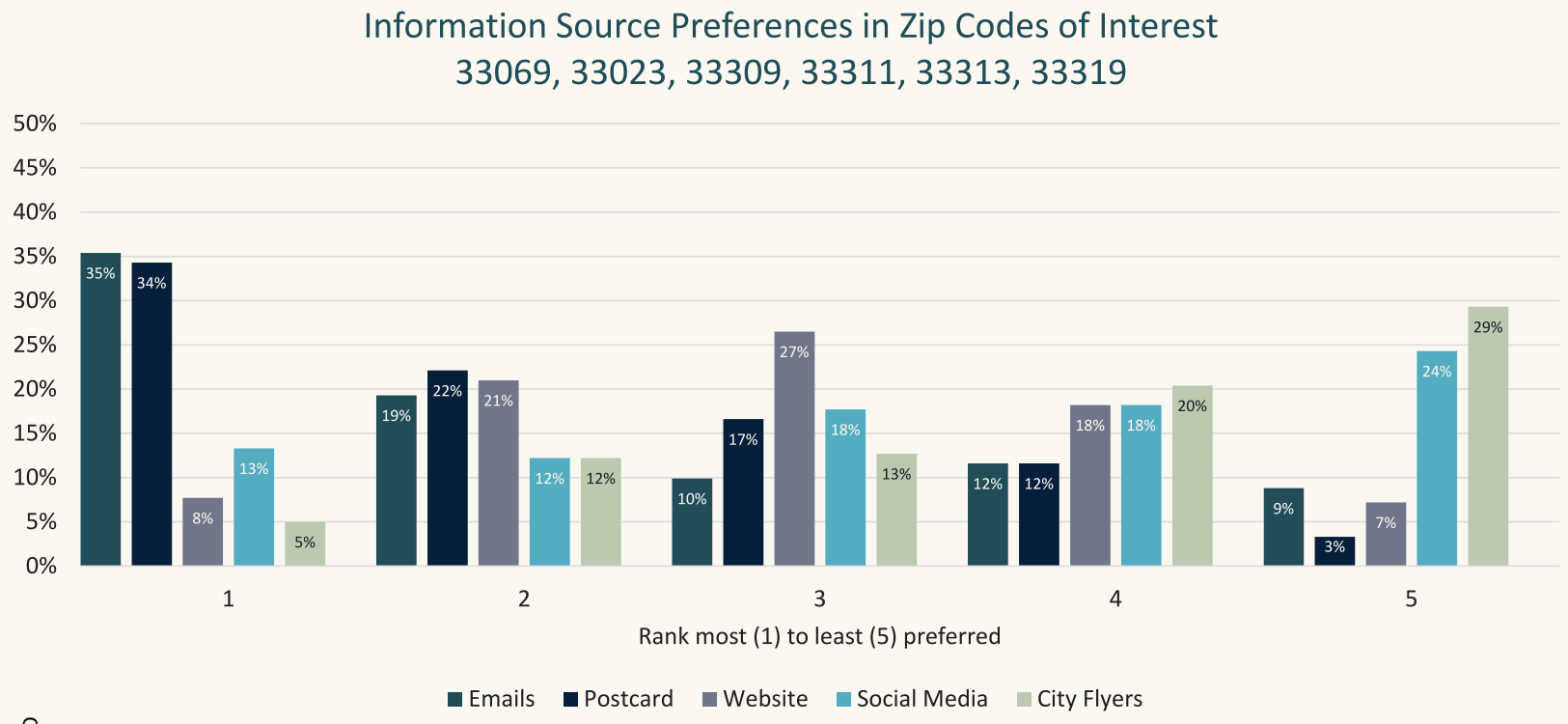
Information Source Preference (n=181)



Emails and Postcards are most preferred, while social media and city flyers are least preferred.

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Conclusions

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Conclusions

- Older and wealthier residents who own homes are overrepresented in the survey responses. This indicates that data weighting for proportionality and more studies are needed to get a more accurate picture of the County population as a whole.
- 71% of renters distrust recycling – the survey strongly shows that multifamily recycling needs to be addressed – more convenience, more education, and trusted messengers are needed.
- Young adults are not being reached – nearly 25% of 25- to 44-year-olds - this should be a target of phone interviews and/or focus groups to determine barriers and opportunities. They indicate post cards are their preference for receiving information.
- Based on the survey responses it is recommended to pursue more targeted education on recycling contaminants.
- More than half of residents in single family homes who recycle distrust that their recycling is getting recycled. This indicates the need for a trusted messenger.

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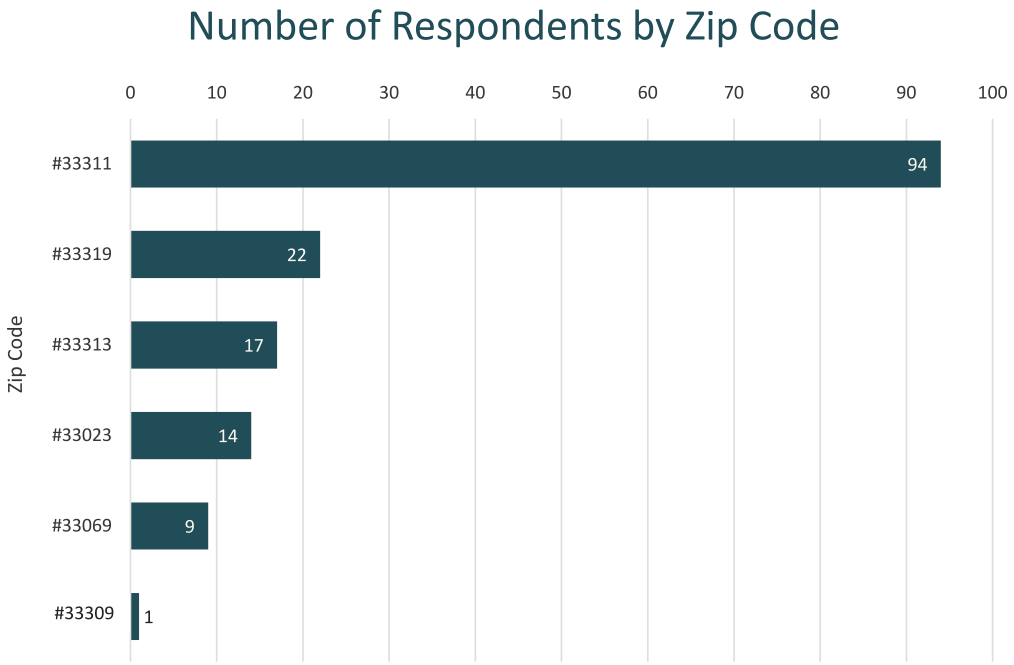
Appendix

Zip Codes of Interest

Additional Demographic Information as Requested by Broward County.

Only Zip Code 33311 can be considered representative due to the number of respondents approaching 100.



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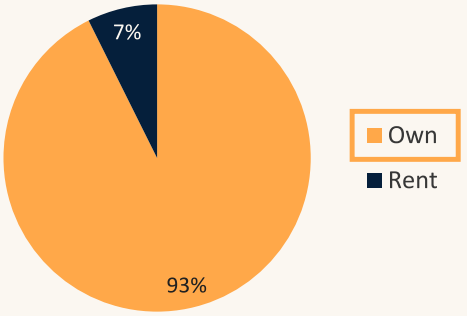
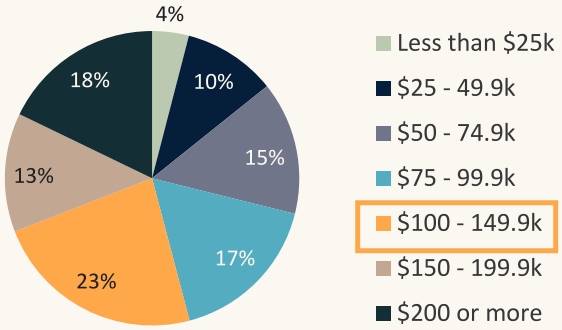
Broward County English-Speaking Respondent Demographics. n=2043

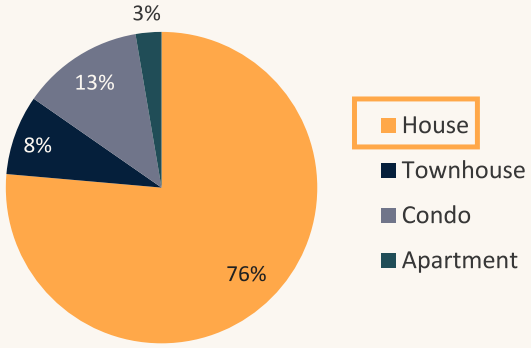
Rent/Own n=2025



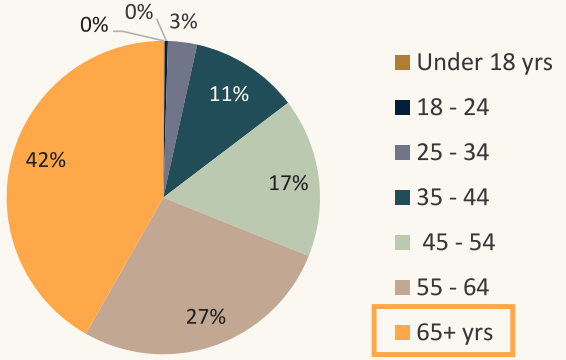
Income n=1340



Property Type n=2016



Age n=1930



Homeowners & those over 65 are overrepresented in survey responses.

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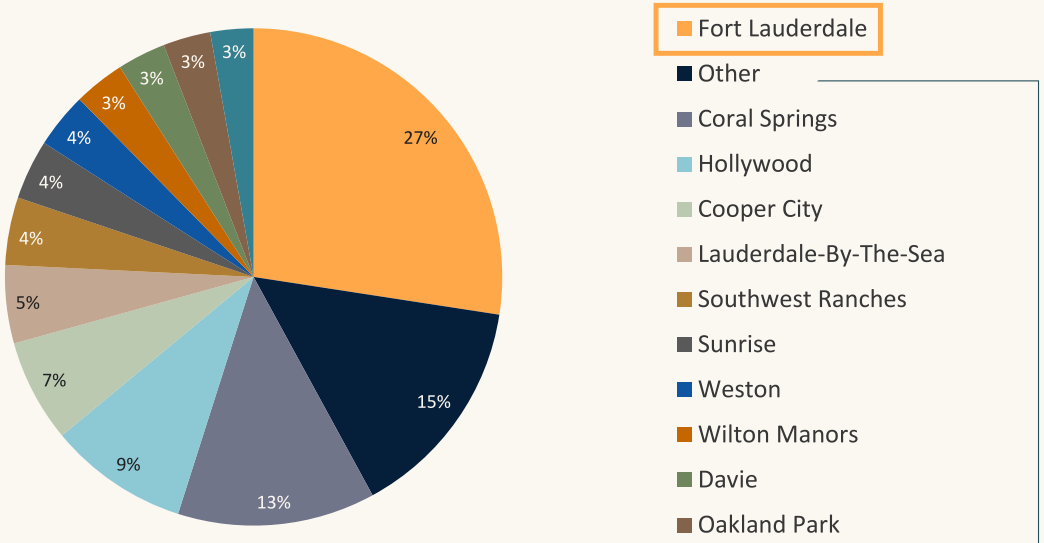
Broward County English-Speaking Respondent Demographics.

City n=1750



Cities represented by **2% or less** of respondents:

- Boulevard Gardens
- Broadview Park
- Coconut Creek
- Dania Beach
- Franklin Park
- Hillsboro Beach
- Lauderdale Lakes
- Lauderhill
- Lighthouse Point
- Margate
- Miramar
- North Lauderdale
- Parkland
- Pembroke Pines
- Pompano Beach
- Roosevelt Gardens
- Sea Ranch Lakes
- Tamarac
- Washington Park
- West Park

Respondents from Fort Lauderdale had higher survey participation and are therefore overrepresented in the results.

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Profiles of Interest: The Young, Urban Renter

18 to 44 years

Income below $75k

Renters, or live in townhouse, condos, or apartments

Access & Perceptions

Renters, often in townhouses, condos, and apartments do not have separate carts; they have dumpsters located in a designated area of the property.

Lack recycling information, access and convenience to recycling.

Uncertain about whether curbside recyclables get recycled.

Recycling Habits & Barriers

More likely to consider all items or none of the items as allowed for recycling; higher likelihood to not recycling due to lack of access and information.

Indicate a desire to learn more.

Communication Preferences

Ages 18-44 prefer postcards and are twice as likely to prefer social media compared to ages 65+.

Key Take-Aways

1. Need for improved outreach through preferred channels.
2. Bring recycling to top of mind for those who have recycling collection and pick up out of sight (e.g., not noticeable like curbside recycling).
3. Elect trusted messengers to rebuild trust in system across County since renters are more transient.

Profiles of Interest: The Established Homeowner

45+ years

Income above $75k

Homeowner

Access & Perceptions

Likely to have separate carts for trash and recycling

Despite having separate carts, they find recycling inconvenient.

Most distrust curbside recycling.

Recycling Habits & Barriers

More likely to wishcycle, stating that most or all items presented are allowed for recycling.

May require more targeted education on contaminants.

Have yard waste and participate in yard waste collection through curbside or landscaper.

Communication Preferences

Prefer email communication and postcards.

Key Take-Aways

1. Improve education of proper recycling practices to reduce wishcycling.
2. Strengthen trust in curbside recycling through transparency and consistency.
3. Use email outreach or postcards to disseminate information and updates.

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Conclusions

- Older and wealthier residents who own homes are overrepresented in the survey responses. This indicates that data weighting for proportionality and more studies are needed to get a more accurate picture of the County population as a whole.
- 71% of renters distrust recycling – the survey strongly shows that multifamily recycling needs to be addressed – more convenience, more education, and trusted messengers are needed.
- Young adults are not being reached – nearly 25% of 25- to 44-year-olds - this should be a target of phone interviews and/or focus groups to determine barriers and opportunities. They indicate post cards are their preference for receiving information.
- Based on the survey responses its recommended to pursue more targeted education on recycling contaminants.
- More than half of residents in single family homes who recycle distrust that their recycling is getting recycled. This indicates the need for a trusted messenger.

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Appendix E

Post-Meeting Report: Broward County Solid Waste Management Public Workshop

October 24, 2024
File No. 123

MEMORANDUM

TO: Todd Storti, Solid Waste Disposal and Recyclable Materials Processing Authority of Broward County

FROM: Mercury Public Affairs

SUBJECT: Post-Meeting Report: Broward County Solid Waste Management Public Workshop

Post-Meeting Report: Broward County Solid Waste Management Public Workshop

September 18, 2024

6-8 PM

Veterans Park

7600 NW 50th St, Lauderhill, FL 33351

General Overview:

The first solid waste management public workshop saw active participation from over 100 individuals, both online and in person, with most attendees welcoming the proactive approach of soliciting feedback before the master plan is drafted. This initiative was recognized as a positive step toward creating a more effective and sustainable waste management system. Participants openly shared their perspectives, offering valuable insights into how current services are perceived and what improvements could be made.

A recurring theme from the workshop was that "there is no 'away' for garbage"—a reminder that all waste has consequences, and how we manage it affects the environment and health of our communities.

Additional Quotes Captured:

“We need incentives and penalties to recycle right and to compost.”

“Get us personally involved somehow.”

“Provide more educational units to schools showing the importance of recycling.”

Community Outreach:

For outreach ahead of the September 18th solid waste management public workshop, we focused on ensuring broad community participation through strategic planning and multiple communication channels.

Key Outreach Activities:

- **Location Logistics:** Secured a centrally located facility in Broward County (e.g., Plantation, Davie, Lauderhill) to minimize travel time and increase turnout.
- **Invitation Distribution:** Developed an invitation graphic and email templates for wide distribution through multiple outlets. Printed and distributed flyers to city halls, community centers, and churches throughout Broward County.

Channels of Engagement:

- Collaborated with city and county PIO’s to share invitation and meeting details via email listservs, social media, newsletters, and official websites.
- Conducted outreach to supportive elected officials and community leaders to promote the event through their networks.
- Created a Facebook event to register attendees and share updates.
- Coordinated press outreach targeting outlets like the Sun Sentinel, WLRN, local African-American and Spanish-language publications, and local TV stations.
- Engaged community organizations (Broward League of Cities, League of Women Voters, local chambers, Sierra Club) to share invitation and meeting details.

Data & Feedback:

- During the public workshop, we collected feedback via:
    - Note cards; Note cards were distributed as a way to collect individual answers to the questions
    - Volunteer note takers; One person volunteered per group to take notes and present a summary of their group’s discussion following each feedback session.
    - Poster boards; Participants came up to the poster boards to indicate their thoughts on current solid waste management fees

    - Online survey: A survey was provided for participants tuning in online as a way to provide input to the questions asked to in-person participants.
- Overall, we collected **162 notecards** on which participants provided answers to the questions posed as well as their insights into current services provided and potential improvements. 48 of the notecards answered question 1A, 46 answered question 2A, 32 answered question 1B, and 36 answered question 2B.
- **More than 80 individuals** provided their contact information upon arrival, including name, city, email address, and phone number. This allowed us to create a list that we can refer to for future meetings and communications by the Broward SWA.
- We received **10 online survey submissions**; All meeting materials remain on the Broward SWA website, including the survey for individuals who were unable to attend the first public workshop but would still like to provide feedback.

Feedback Summary – Session 1:

1A. How much do you think you are paying for services now? *(Share the information on how much cities pay; The list of cities was not exhaustive)*

1B. Do you think that is too much, too little, or just right?

Key Insight: Many participants were not aware of what they currently pay for solid waste management services. Upon seeing the provided list of fees and their corresponding cities, most participants believed they were paying the right amount for current services; However, most also indicated a willingness to pay more for a system that is more sustainable and environmentally conscious.

1C. What factors do you believe most influence the costs associated with waste management?

- Participants identified a wide range of factors affecting costs, including:
    - Transportation and logistics
    - Staff salaries and insurance
    - Fuel costs
    - Frequency of waste pick up
    - The amount and types of waste collected
    - Resident education programs
    - Tipping fees
    - Equipment and procurement processes
    - Weather conditions and overflow pickups

1D. Should the solid waste management practices be consistent across all sectors customer types (e.g., households, businesses, and air/seaports)?

Opinions were split somewhat evenly on whether or not waste management practices should be standardized across all sectors.

Group 1 (Pro-Consistency):

- Argued for uniform and mandatory standards across cities and towns.
- Suggested that costs could be balanced and educational programs standardized, with incentives for waste reduction and strict enforcement.

Group 2 (Against Uniformity):

- Advocated for waste management costs and practices to vary based on property size and type of waste.
- Emphasized that businesses should bear a greater financial responsibility, and fees should reflect usage.

Feedback Summary – Session 2:

2A. What specific benefits do you see from recycling in your household or community and what type of incentives or improvements (e.g., lower fees, rewards) would make you more likely to actively participate in better solid waste segregation (e.g., recycling, composting)?

Attendees discussed the numerous benefits of recycling, including its positive effects on health, the environment, and reducing landfill waste.

Suggestions for increased participation included:

- Mandatory recycling for businesses
- Financial incentives and rebates for recycled materials
- Incorporating recycling education into schools
- Clear labeling of recycling containers
- Stronger policies on reducing plastic usage
- Encouraging composting and offering rebates for such activities

2B. Would you separate food waste from other garbage if a new organics collection was available?

Most participants were in favor of separating food waste if an organics collection program became available, with one attendee noting, "We would do or pay for anything to avoid an incinerator."

2C. What community programs do you think would most effectively encourage other residents/households to adopt better waste management practices (e.g., education campaigns, convenient services, financial incentives, look up other best practices from successful SWAs)?

Participants suggested several initiatives to encourage broader adoption of sustainable waste practices:

- Recycling and composting workshops in multiple languages
- Neighborhood and city-wide competitions for waste reduction
- Education campaigns, especially targeting youth
- Incentives for households and businesses that meet waste reduction targets
- More public recycling bins and composting options in public spaces
- Increased enforcement against illegal dumping

Key Takeaways:

- There is a strong appetite for a more sustainable and consistent waste management system, even if it comes with a higher cost.
- Educational campaigns, incentives, and standardized programs are seen as crucial to encouraging wider participation in recycling and composting.
- Participants expressed a willingness to adapt to new systems, including separating organic waste, as long as the benefits and processes are clearly communicated.
- There is significant support for community engagement efforts such as neighborhood competitions, public education initiatives, and enhanced enforcement measures to reduce waste and promote recycling.

Report Addendum - Solid Waste Authority Community Outreach Survey

1. **First Name**

2. **Last Name**

3. **Email Address**

4. **Street Address**

5. **City and State**

6. **Zip Code**

7. **How much do you think you pay for solid waste services now? (In $USD)**

8. **Do you think this is too much? Just right? Not enough?**

   For comparison:
   Average electric bill in Florida: $130/mo
   Average cable and internet bill in Florida: $111/mo
   DirectTV subscription: $64.99/mo
   Amazon Prime Subscription: $11.59/mo
   Netflix Standard Subscription: $15.49/mo

   - Too little
   - Just right
   - Too much

9. **What do you think is the most influential factor to the costs associated with waste management?**

10. **Should the solid waste management practices be consistent across all customer types? (households, businesses, industrial, airports/seaports)**

    - Yes
    - No

11. **What specific benefits do you see from recycling in your household or community and what types of incentives or improvements (e.g., lower fees, rewards) would make you more likely to actively participate in better solid waste segregation (e.g., recycling, composting)?**

12. **Would you separate food waste from other garbage if a new organics collection was available?**

    - Yes
    - No
    - Maybe

13. **What community programs do you think would most effectively encourage other residents/households to adopt better waste management practices (e.g., education campaigns, convenient services, financial incentives, look up other best practices from successful SWAs)?**

Appendix F

Task 2 White Paper – Existing Resources

Solid Waste Authority of Broward County

Task 2 White Paper: Evaluate Existing Solid Waste Disposal and Recycling Processes and Resources in Broward County

Solid Waste Authority of Broward County
115 South Andrews Avenue, Room 122
Fort Lauderdale, FL 33301

SCS ENGINEERS

09224106.00, Task 00002 | December 19, 2024

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1.0 INTRODUCTION

Broward County (County) entered into an Interlocal Agreement (ILA) in 1987 with 26 municipal cities, which created the Resource Recovery Board (Board) and Resource Recovery System (System). The ILA expired in 2013, leaving all parties individually responsible to administer contracts for the disposal of their solid waste streams, or enter into a new agreement under new conditions. Legal action ensued after the ILA expiration related to the equitable distribution of all Board assets amongst the members. On April 7, 2015, Broward County and the Board/System settling parties entered into a settlement agreement, which resolved litigation over the distribution of assets and liabilities resulting from the expiration of the ILA. The settlement agreement resolved litigation and resulted in pro rata distribution of $32 million to the municipal members of the System.

On June 14, 2016, the first amendment to the settlement agreement was entered, which delayed the sale of the Alpha 250 site. The purpose of the delay was to allow the cities and Broward County to perform a study of various solid waste and recycling issues. Specifically, the first amendment stipulated that the study evaluate and provide recommendations regarding the following:

1. How a 75 percent County-wide recycling goal may be reached.

2. Whether retaining public ownership of Alpha 250 would facilitate the meeting of that recycling goal or would provide other benefits in connection with solid waste disposal within Broward County.

3. General solid waste disposal issues as determined by the Working Group which may include options regarding flow control and potential governance or contractual structures for collaborative management of solid waste disposal.

In 2018, Arcadis, U.S., Inc., along with Kessler Consulting, Inc., developed the Solid Waste and Recycling Issues Study, (Study) which provided recommendations on various matters, including reaching a 75% countywide recycling goal, retaining ownership of public land for the construction of solid waste or recycling facilities, and other supplemental approaches to solid waste management. In response to recommendations provided in the Study, a Solid Waste Working Group (SWWG) was established, consisting of eight municipal members and one County member, to create a framework for an independent governing entity comprised of the County and municipalities that would develop and implement a cooperative approach to managing solid waste and recycling

The SWWG worked together to develop an ILA creating the Solid Waste and Recyclable Materials Processing Authority of Broward County, Florida (Authority), which was presented to all municipalities in the County, throughout the Summer of 2023. Twenty-eight municipalities and the County executed the ILA and agreed to participate in the Authority.

One of the Authority's first orders of business was to develop a Regional Solid Waste and Recycling Master Plan (Master Plan) that will serve as the foundation for the future of the Authority. This White Paper evaluates the existing solid waste disposal and recycling processes and resources (Existing Resources) currently in operation in Broward County and serves as the first step in the development of the Master Plan.

1.1 EXISTING STUDIES

The below existing studies were reviewed, and the findings from each were considered, in the development of this White Paper.

- Broward County 2023 Waste Characterization Study Final Report (SCS Engineers, April 2023)
- Waste Generation Study (SCS Engineers, Draft)
- Solid Waste and Recycling Issues Study (Arcadis, U.S., Inc. and Kessler Consulting, Inc., December 2018)
- 2023 Broward County and Municipal Population Forecast and Allocation Model (PFAM), published by the Broward County Planning and Development Management Division

1.2 SOURCES OF INFORMATION

The following sources of information were utilized in the development of this White Paper:

1. Publicly available reports and permits were obtained for relevant permitted solid waste handling facilities within the County from FDEP and ENVIROS
2. U.S. Census Bureau data and reports
3. Municipal websites
4. Authority provided information in response to the data request issued in June 2024 and October 2024:
   - Collection contracts and franchise agreements (residential, multi-family, and commercial) for each ILA member
   - Residential Solid Waste and Recycling Service Providers – summary spreadsheet for all County municipalities prepared by Broward County Solid Waste and Recycling Services dated May 21, 2024

It should be noted that as of the writing of this White Paper, municipal collection and/or disposal contracts for the following were not available for review, and assumptions were made regarding the transporting and disposal facility that waste from these municipalities were delivered to:

- Hillsboro Beach
- Pembroke Park
- Sea Ranch Lakes

2.0 EXISTING SOLID WASTE SYSTEM

The existing processes for collecting, transporting, recycling, and disposing of solid waste generated in the County were evaluated in order to develop a synopsis of the various processes currently utilized by the County and the ILA member cities. Below provides a summary of these findings.

2.1 BROWARD

2.1.1 Study Area Description

Broward County, located in the Miami metropolitan area, covers an area of 1,224.7 square miles, spanning 50.3 miles from east and west, at its widest points, and roughly 27.4 miles from north to south. The County is generally low-lying and flat with elevations ranging from zero to 29 feet, averaging six feet above sea level. Rich in coastal resources, the County features over 300 miles of Intracoastal Waterway and traversable inland canals as well as 23 miles of Atlantic beaches. In addition to the County's 69 miles of live coral reef, it also features over 100 artificial reefs.

Located in the subtropical climate zone, the County is characterized by mild, wet winters and long, hot, humid summers. Latitude, prevailing winds, storms, pressure systems, ocean currents, and the distribution of land and water are among the primary factors that govern Florida's climate. The County receives both bountiful sunshine (3,000 hours per year) and rain (an average of 65 inches per year); the heaviest rainfall occurs in August and September. Annual temperature averages for winter and summer are 66°F and 84°F, respectively; the overall annual average is 76°F.

In terms of geology, the County is relatively new and located at the eastern edge of a carbonate plateau known as the Florida Platform. The County is primarily composed of Oolite limestone and Bryozoa. Composed of Cenozoic sediments, the wedge-shaped Biscayne aquifer is the primary component of the County's hydrogeology. Ranging from 350 feet thick in the east to 160 feet thick in the west, transmissivity varies from the southeast to the northwest but is generally greater in the south or southeast.

Many parks, preserves, and certified wildlife habitats exist to protect the County's diverse flora and fauna. Primary ecosystems include coastal wetlands, freshwater wetlands, beach and dune communities, and an assortment of marshes, sloughs, and wet prairies of which the larger Everglades system is comprised. A variety of fauna may be found in the County, such as black bears, alligators, opossums, panthers, coyotes, tortoises, sea turtles, iguanas, lizards, a diverse mix of birds and more.

Of the County's total area, 34.9% is developable and 65.1% consists of conservation areas. The 427.8 square miles of developable area is used for commercial, agricultural, residential, recreational, and conservation purposes. Less than 5% of the County's land is now dedicated to agriculture. Considering the County's anticipated population growth of 235,000 new residents by

2040, the Broward County Commission undertook an evaluation and update of the Broward County Land Use Plan (BCLUP) in 2014; this effort is known as "BrowardNext." The urgent areas this update aimed to address include issues such as climate change resilience, targeted redevelopment, natural resource protection enhancement, affordable housing, disaster planning, and multimodal transportation.

The County's transportation system offers land, air, and water-based options. Fort Lauderdale/Hollywood International Airport serves over 80,000 people daily; heavy traffic holidays can increase that number to over 400,000. The County's system of bikeways, greenways, and pedestrian facilities is extensive and growing. Bus and shuttle options include Broward County Transit, private shuttles, and Transportation Management Associations, as well as Express Bus services.

Passengers also have rail options. South Florida Regional Transportation Authority (SFRTA) operates Tri-Rail, a tri-county commuter rail service, along the CSX corridor. Privately-owned intercity train Brightline, which operates along the Florida East Coast Railway corridor, provides travel options to stations located close to local transportation in populous areas for commuters and vacationers alike. Amtrak operates on the South Florida Rail Corridor, running Silver Service and Palmetto routes from Miami through Fort Lauderdale. CSX Transportation also operates freight service on the South Florida Rail Corridor. In partnership with Port Everglades, Florida East Coast Railway constructed an Intermodal Container Transfer Facility (ICTF), which has been in operation and improving connectivity with shipping clients since 2014.

Port Everglades, one of the most diversified seaports in Florida, serves as a port of call for international cargo and cruise passenger ships. Scaled-down water transportation options include Riverwalk Water Trolley, operated by the Downtown Fort Lauderdale Transportation Management Association, and Water Taxi, a privately owned service providing shuttles in Fort Lauderdale and Hollywood. Finally, the County's roadways cover 5,128 miles of public roads, ranging from two-lane neighborhood streets to expressways. Toll roads include the Sunshine State Parkway, Florida's Turnpike, Sawgrass Expressway, I-595 Reversible Managed Lanes, and managed lanes on I-75 South.

2023 was a year of extremes for the County, characterized by record-breaking rainfall and temperatures. The County's low-lying, flat landscape and extensive shoreline make it vulnerable to flooding, storms, sea level rise, higher king tides, groundwater table rise, and storm surge. Extreme heat also poses a climate threat; the heat index exceeded 105°F for 37 days in 2023 and is expected to extend beyond 60 days by 2050.

Of the County's 1.94 million residents, 63.7% are employed. The median age is 41.5 years, median household income is $74,531, and 36.6% have a bachelor's degree or higher. 12.7% of the population live below the poverty line and 10.9% are without health care coverage. Over 44% of the County's diverse population speak a language other than English at home. Of the 860,329 total housing units, 756,657 units are occupied, and 103,672 are vacant. Races and ethnicities represented include American Indian and Alaska native, Asian, Black or African American, Hispanic or Latino, native Hawaiian and other Pacific Islander, two or more races, and more.

The County's Annual Action Plan FY 2024-2025 cites the following priorities: preserve and develop affordable housing; expand and improve public infrastructure/facilities; public services and quality of life improvements; and homelessness housing and support services. Additional goals listed by the County Commission include providing an **accountable government**, **economic opportunity** (with a focus on the lower and middle class, emphasis on affordable housing), and a **connected**

(transportation, awareness and understanding), **healthy** (human services, culture, arts, recreation, and learning), **resilient** (investments in renewable energy, sustainable practices, manufacturing, resilient infrastructure, and environmental protection) community.

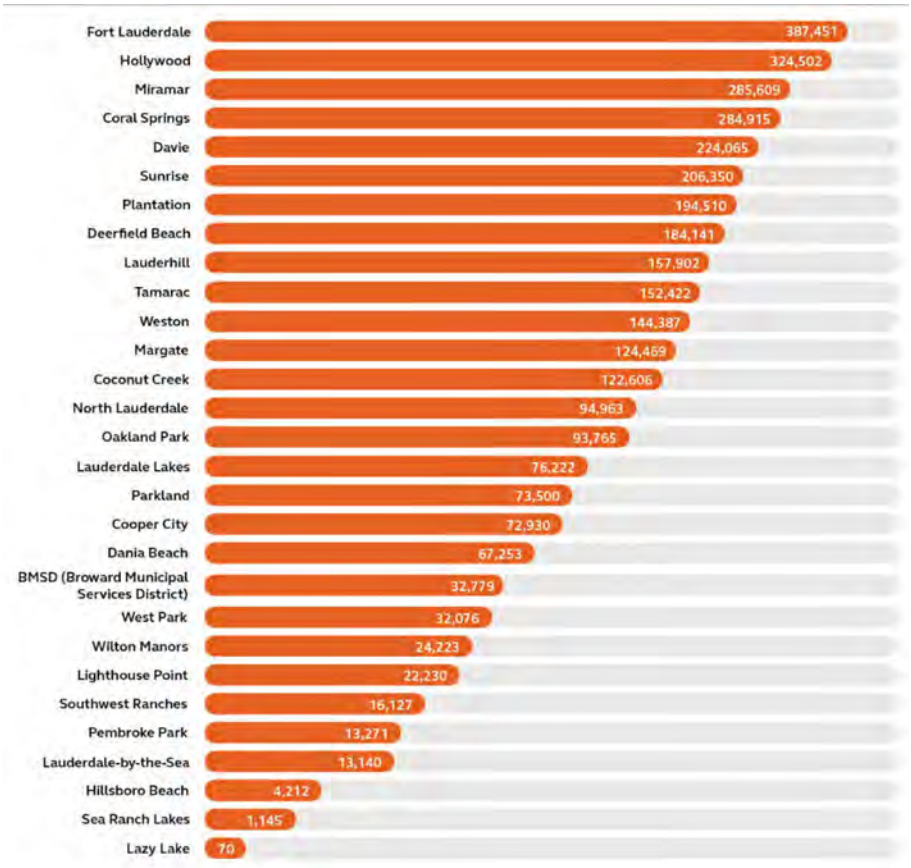
2.1.2 Population Estimates

Based on the 2020 Census, Broward County is the second most populated county in Florida, after Miami-Dade County, and the 17th most populated in the United States. As of the 2020 Census, Broward County had 1,944,375 residents. While this total population drives the total waste tonnage estimates, more detailed population growth rate estimates are needed for each ILA member community to estimate the tonnage and composition of solid waste that they are currently generating and project the tonnages they will generate in future years. Refer to Section 4.2 for a more detailed discussion.

2.1.3 Waste Generation Estimates

The estimate of waste generation (presented in **Figure 1**) is based on the County data in the FDEP reports titled *2020 Municipal Solid Waste (MSW) Collected and Recycled by Generator Type By Descending Population* and *2020 Total Tons of MSW Materials Collected and Recycled In Florida*. This data includes total population (as reported by the US Census Bureau) and the total tons of single-family, multi-family, and commercial MSW collected. Refer to Section 4.2 for a more detailed discussion of the calculation methodology.

Figure 1. Broward County Waste Generation by Municipality, tpy, 2020



2.2 ILA MEMBER COMMUNITIES

A summary table of ILA member populations, and collection/disposal contracts is provided in Appendix A. Further details on each ILA member can be found in the following subsections.

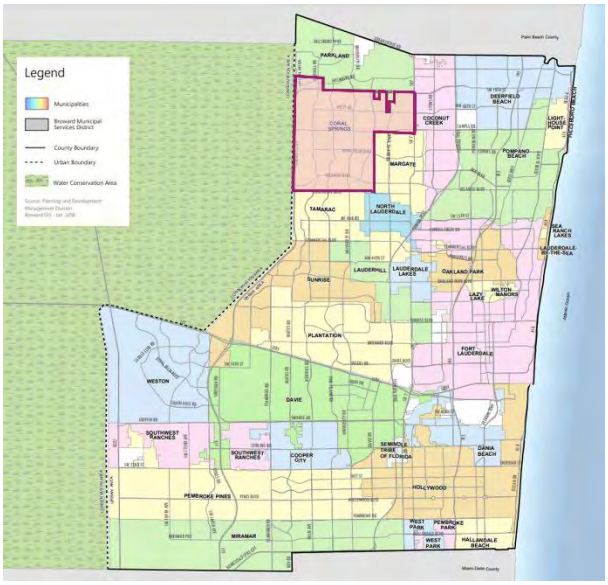
2.2.1 Large ILA Members

2.2.1.1 City of Coral Springs

Municipality Characteristics

The City of Coral Springs is located in northern Broward County and has an area of approximately 8.3 square miles, as shown in **Figure 2**. The City has a population of approximately 134,394 residents according to the 2020 census, which has remained stable. Housing is almost entirely (66%) single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City population is expected to remain steady or slightly increase in the near future. The City currently generates an estimated 333,224 tons of waste per year.

Figure 2. The City of Coral Springs



Collection and Disposal Contracts

Routing information reviewed was provided by the City, and the Authority. The destination of materials was provided by the City as part of the data request as follows:

- An agreement with Coastal Waste & Recycling of Florida was executed in 2024 for the collection of both residential and commercial MSW, Recycling, C&D and White Goods. This agreement is valid through September 30, 2031 with the option to renew for two additional five-year terms. A termination clause allows either party to terminate the contract only for cause.

- Agreement with Waste Management (WM) for single stream recycling services was executed on October 18, 2023, for receiving recyclables into the WM Recycling Deerfield facility. This agreement is valid for five years with the option to renew for two additional one-year terms. A termination clause would allow the City or the contractor to terminate the contract for convenience with 120-days written notice.

Destination of Materials

The following discusses the routing of materials from the City of Coral Springs to the various solid waste and recycling facilities. The routing of materials information was determined from review of the City's collection and disposal contracts, the municipality website or the summary table developed by Broward Solid Waste and Recycling Services (SWRS),

- Residential MSW: South Broward RRF
- Commercial MSW: Left open to the collector to decide, assumed to be sent to the South Broward RRF
- Residential Source Separated Recyclables: WM Recycling- Deerfield (Sun 11 MRF)
- Commercial Source Separated Recyclables: Left open to the collector to decide, assumed to go to WM Recycling Deerfield (Sun 11 MRF)
- C&D and White Goods: WM Recycling- Deerfield (Sun 11 MRF)

2.2.1.2 Town of Davie

Municipality Characteristics

The Town of Davie is located in south-central Broward County and has an area of approximately 35.7 square miles, as shown in **Figure 3**. The Town had a population of approximately 105,691 residents according to the 2020 census, which is now estimated at approximately 106,538. The majority (about 66%) of housing consists of single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the Town's population (and housing) is expected to increase at an annual rate of approximately 0. 3 -1% through 2035 and then slightly increase at approximately 0.2% through 2045. The Town currently generates an estimated 264,215 tons of waste per year.

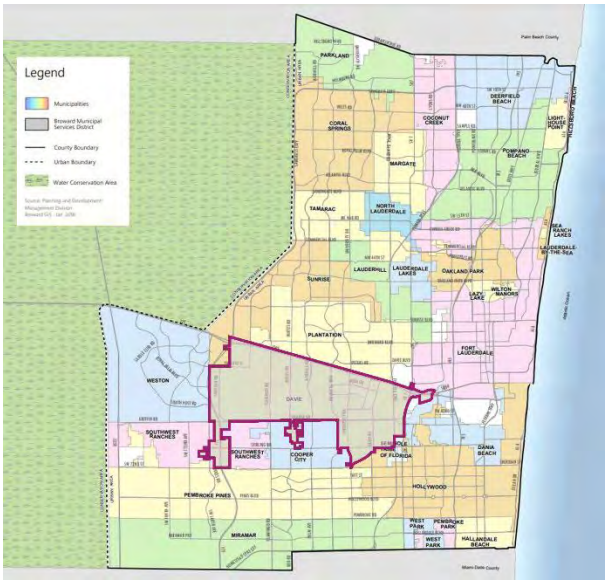
Collection and Disposal Contracts

Routing information reviewed was provided by the City and the Authority. The destination of materials was provided by the City as part of the data request as follows:

- The Town entered into an agreement with Coastal Waste and Recycling on January 20, 2021 for the collection of MSW, recycling, C&D and White Goods. This agreement is valid through December 31, 2030, with the option to renew for three additional five-year terms.
  - An amendment was executed on August 4, 2021, to modify payment for residential curbside collection services.

- A Memorandum of Understanding (MOU) was established on June 8, 2022, to provide for a temporary fuel surcharge.
- A second MOU was established on September 21, 2022, to extend the temporary fuel surcharge for six months.
- A second amendment was executed on September 21, 2022, to modify the CPI adjustment from 3% to 4%
- A third MOU was established on April 19, 2023, to extend the temporary fuel surcharge for an additional six months.

Figure 3. The Town of Davie



Destination of Materials

The following discusses the routing of materials from the Town of Davie to the various solid waste and recycling facilities. The routing of materials information was determined from review of the Town's collection and disposal contracts, the municipality website, the summary table developed by Broward SWRS, or based on distance from the Town to the nearest facility,

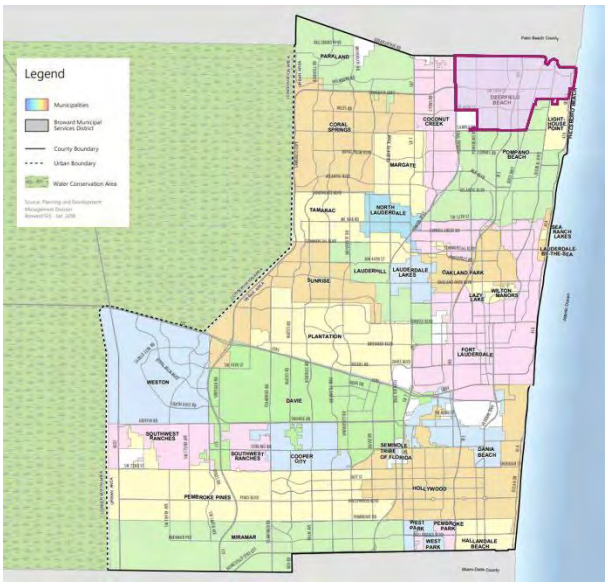
- Residential MSW: South Broward RRF
- Commercial MSW: South Broward RRF
- Residential Source Separated Recyclables: Commingled with Residential MSW; South Broward RRF
- Commercial Source Separated Recyclables: Commingled with Residential MSW; South Broward RRF
- C&D and White Goods: WM – Oakes Road

2.2.1.3 City of Deerfield Beach

Municipality Characteristics

The City of Deerfield Beach is located in northern Broward County and has an area of approximately 16.3 square miles, as shown in **Figure 4**. The City had a population of approximately 86,859 residents according to the 2020 census, which is now estimated at approximately 92,400. Housing is almost evenly split between single-family homes (52%), with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate of approximately below 2% and gradually decreases to 0.75 through 2045. The City currently generates an estimated 229,256 tons of waste per year.

Figure 4. The City of Deerfield Beach



Collection and Disposal Contracts

The City of Deerfield Beach provides its own garbage collection services and maintains a drop off location for citizens to bring recyclables.

- The city has signed a contract with Waste Connections of Florida, Inc, from December 2023 through December 2026 for disposal services. This would allow the City of Deerfield Beach to dispose collected waste at the Waste Connections Transfer Station which includes MSW, Bulky waste and C&D waste.

Destination of Materials

The Routing information reviewed was provided by the City, and the Authority. The destination of materials was provided by the City as part of the data request as follows:

- Residential MSW: WCF Deerfield Beach Transfer Station
- Commercial MSW: WCF Deerfield Beach Transfer Station

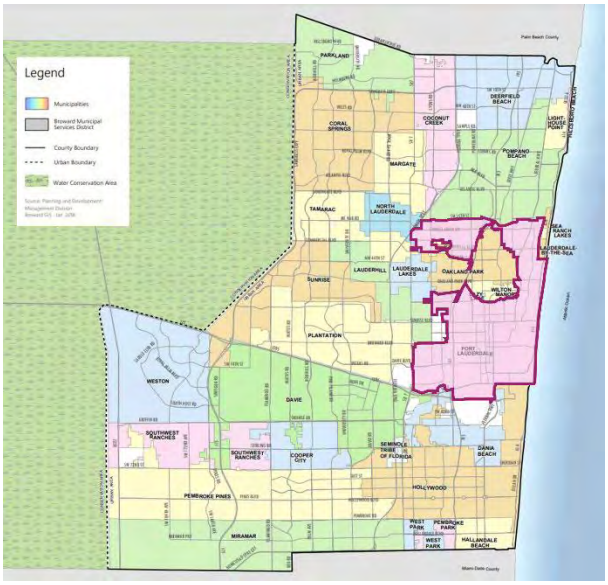
- Residential Source Separated Recyclables: N/A (Collections suspended)
- Commercial Source Separated Recyclables: WM Recycling Deerfield
- C&D and White Goods: WCF Deerfield Beach Transfer Station

2.2.1.4 City of Fort Lauderdale

Municipality Characteristics

The City of Fort Lauderdale is located in central Broward County and has an area of approximately 38.6 square miles, as shown in **Figure 5**. The City had a population of approximately 182,760 residents according to the 2020 census, which is now estimated at approximately 187,175. The majority of housing units (54%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate between approximately 0.6-1.1% through 2045. The City currently generates an estimated 464,195 tons of waste per year.

Figure 5. The City of Fort Lauderdale



Collection and Disposal Contracts

Routing information reviewed was provided by the City, and the Authority. The destination of materials was provided by the City as part of the data request as follows:

- The City entered into an agreement with WM on September 3, 2024, for the disposal of C&D. This agreement is valid for three years until September 2, 2027, with two one-year renewals. A termination clause would allow the city to terminate the contract by cause upon 30 days written notice, and the City would compensate the contractor for services through the termination date specified.

- The City entered into a yard trash processing service agreement with Coastal Waste & Recycling on September 3, 2024, for receiving and processing yard trash at the Coastal MRF in Pompano Beach. This agreement is valid until September 2, 2027, with the option to renew for two additional one-year terms. A termination clause allows the City to terminate the contract by cause upon 30 days' written notice, and the City would compensate the contractor for services through the termination date specified.

- The City entered into an agreement with WM on January 25, 2023 for the collection of residential MSW, curbside recycling, yard trash, tires, electronics and bulk waste/White Goods. This agreement is valid for seven years expiring July 30, 2030 with the option to renew for two additional four-year terms. A termination clause would allow the City to terminate the contract by cause upon 30 days written notice, and the City would compensate the contractor for services through the termination date specified.

- The City entered into a recyclables processing services agreement with WM on February 9, 2023, for receiving recyclables into the WM Davie Transfer Station. This agreement is valid through July 30, 2030, with no clear terms of renewal. A termination clause would allow the City to terminate the contract for cause with 30 days' written notice, and the City would compensate the contractor for services through the termination date specified.

- The City entered into a Bulk Waste/White Goods processing services agreement with WM on February 9, 2023, for receiving Bulk Waste/White Goods into the WM Oakes Road facility. This agreement is valid until July 2, 2024, with the option to renew for two additional one-year terms. A termination clause would allow the City to terminate the contract for cause with 30 days' written notice, and the City would compensate the contractor for services through the termination date specified.

Destination of Materials

The following discusses the routing of materials from the City of Fort Lauderdale to the various solid waste and recycling facilities. The routing of materials information was determined from review of the City's collection and disposal contracts, the municipality website, the summary table developed by Broward SWRS, or based on distance from the City to the nearest facility,

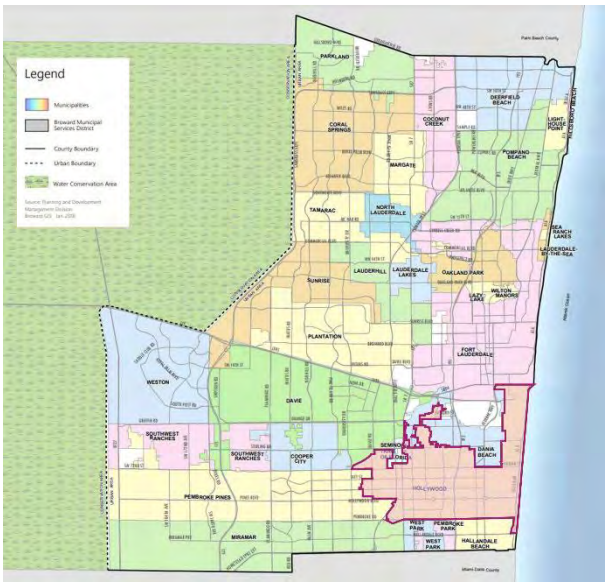
- Residential MSW: South Broward RRF
- Commercial MSW: Privately collected, flow controlled via ordinance to go to South Broward RRF
- Residential Source Separated Recyclables: WM Reuters
- Commercial Source Separated Recyclables: Open market and not flow-controlled
- C&D and White Goods: WM Oakes Road or Monarch Hill Landfill

2.2.1.5 City of Hollywood

Municipality Characteristics

The City of Hollywood is located in southern Broward County and has an area of approximately 30.8 square miles, as shown in **Figure 6**. The City had a population of approximately 153,067 residents according to the 2020 census, which is now estimated at approximately 152,224. The majority of housing units (58%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to slightly decrease initially, then increase at an annual rate of approximately 0.4 – 0.6% through 2045. The City currently generates an estimated 377,566 tons of waste per year.

Figure 6. The City of Hollywood



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active disposal agreements.

- The City entered into a temporary disposal services agreement with WIN Waste on October 14, 2024, for receiving MSW and C&D waste to the South Broward Waste to Energy facility. This agreement is valid until Nov 30, 2024.

- The City is currently in the process of entering into the ILA for disposal services for MSW, Recyclables, Yard Waste, C&D and Bulky Waste.

Destination of Materials

The following discusses the routing of materials from the City of Hollywood to the various solid waste and recycling facilities. The routing of materials information was determined via correspondence as part of the data request with the City participating in the ILA for disposal services.

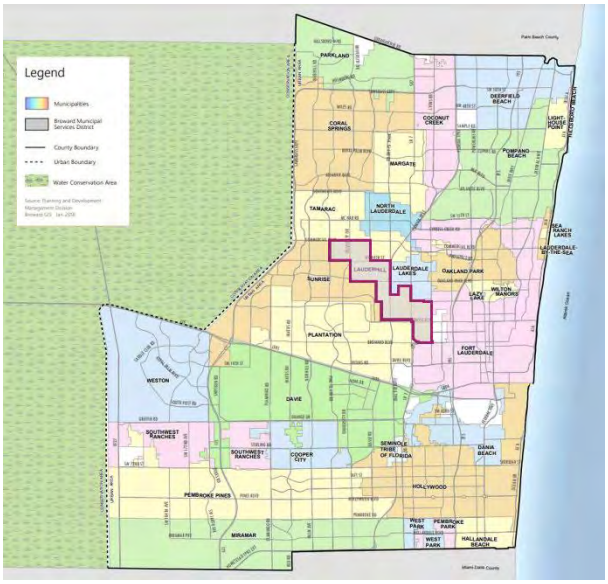
- Residential Solid Waste: South Broward RRF
- Commercial Solid Waste: South Broward RRF
- Residential Recycling: South Broward RRF
- Commercial Recycling: South Broward RRF
- C&D and White Goods: WM Oakes Road

2.2.1.6 City of Lauderhill

Municipality Characteristics

The City of Lauderhill is located in central Broward County and has an area of approximately 8.6 square miles, as shown in **Figure 7**. The City had a population of approximately 74,482 residents according to the 2020 Census, which is now estimated at approximately 76,931. Housing is split almost evenly between single-family homes (47%) and multifamily dwellings (52%). Current projections indicate the City's population is expected to initially increase at an annual rate of approximately 0.1 - 1%, then stabilize and have a slight decrease through 2045. The City currently generates an estimated 190,789 tons of waste per year.

Figure 7. The City of Lauderhill



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a summary of the City's active collection and disposal agreements:

- The City executed an agreement with WM on August 29, 2016 for the collection of MSW and White Goods. This agreement was valid for three years with the option of renewal for one additional five-year term.
  - A letter was sent to WM on June 26, 2019 to authorize the five-year extension of solid waste collection services until September 30, 2026.
  - A second amendment was executed on an unknown day September 12, 2024 to extend solid waste and recycling collection services by WM for an additional twelve months until September 30, 2025 with the potential for additional month-to-month extensions as the city undergoes the process of awarding a new bid for collection services. It was noted that the recycling collection services agreement by Waste Pro originally signed in 2014 ended in 2021 and was then continued by WM.

Destination of Materials

The routing information that was reviewed was provided by the City and the Authority. The City provided the destination of materials as part of the data request, as follows:

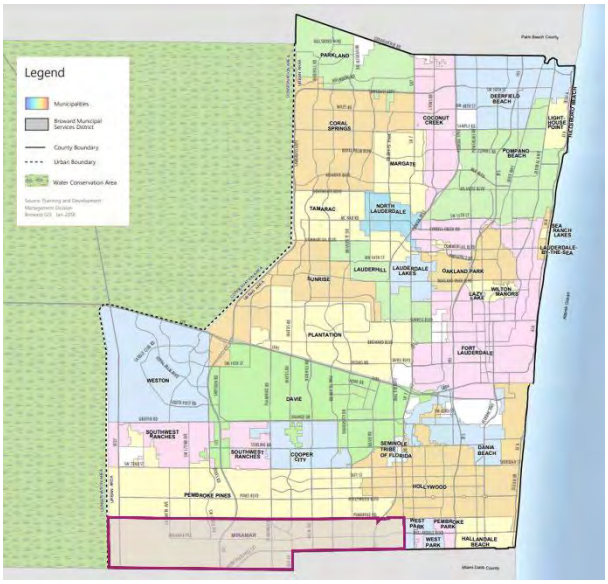
- Residential MSW: South Broward RRF
- Commercial MSW: South Broward RRF
- Residential Source Separated Recyclables: Reuter Recycling
- Commercial Source Separated Recyclables: Reuter Recycling
- C&D and White Goods: C&D privately collected; Bulky waste/Yard waste sent to WM Oakes Rd
- HHW: Broward Drop-off Center
- Electronic Waste: Broward Drop-off Center

2.2.1.7 City of Miramar

Municipality Characteristics

The City of Miramar is located at the southern end of Broward County and has an area of approximately 31.3 square miles, as shown in **Figure 8**. The City had a population of 134,721 residents according to the 2020 Census, which is now estimated at approximately 135,633. The majority of housing units (82%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate of approximately 0.2 – 0.6% through 2045. The City currently generates an estimated 336,370 tons of waste per year.

Figure 8. The City of Miramar



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with Waste Pro on April 13, 2022 for the collection of MSW, White Goods, yard trash and curbside recycling. This agreement is valid for seven years through April 30, 2029 with the option to renew for one additional five-year term, then an option to renew for one three-year term. Contract termination would only occur should the contractor fail to abide by the agreement.

Destination of Materials

The routing information that was reviewed was provided by the City and the Authority. The City provided the destination of materials as part of the data request, as follows:

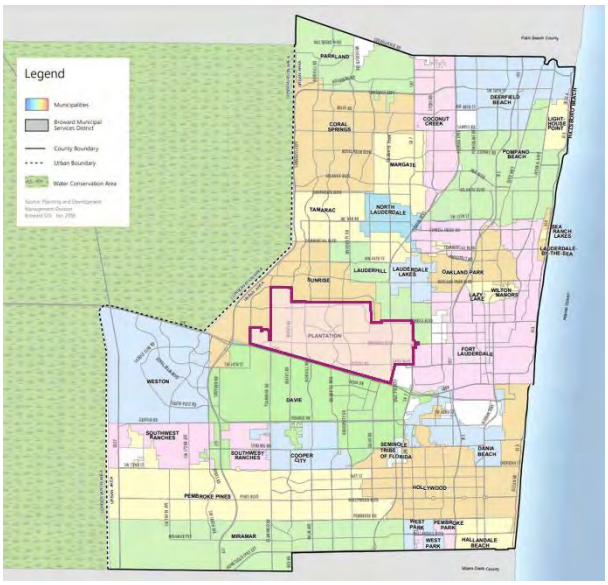
- Residential MSW: South Broward RRF
- Commercial MSW: South Broward RRF
- Residential Source Separated Recyclables: Reuter Recycling
- Commercial Source Separated Recyclables: N/A
- C&D and White Goods: WM Oakes Road

2.2.1.8 City of Plantation

Municipality Characteristics

The City of Plantation is in central Broward County and has an area of approximately 21.9 square miles, as shown in **Figure 9**. The City had a population of 91,750 residents according to the 2020 Census, which is now estimated at approximately 98,120. The majority of housing units (64%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate of approximately 0.15 – 2.1% through 2045. The City currently generates an estimated 243,338 tons of waste per year.

Figure 9. The City of Plantation



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with WM on October 21, 2016 for the collection of Residential MSW White Goods, yard trash, recycling and commercial waste. This agreement is valid for seven years with the option to renew for two additional five-year terms, with the City having the ability to extend a term by three years if needed. A termination for convenience clause allows the City to terminate the contract by convenience with 365 days' written notice, as well as a mutual agreement of termination, if both parties agree at any time.

  – An amendment was executed on August 28, 2019 to include the C.L.E.A.N program to prevent overfilling of containers and illegal dumping.

– An amendment was executed on September 30, 2022 to renew the agreement for the first additional five-year term through September 30, 2028. This amendment also modified some collection rates, collection procedures, and added a section for pay as you throw bag testing.

Destination of Materials

The routing information that was reviewed was provided by the City and the Authority. The City provided the destination of materials as part of the data request, as follows:

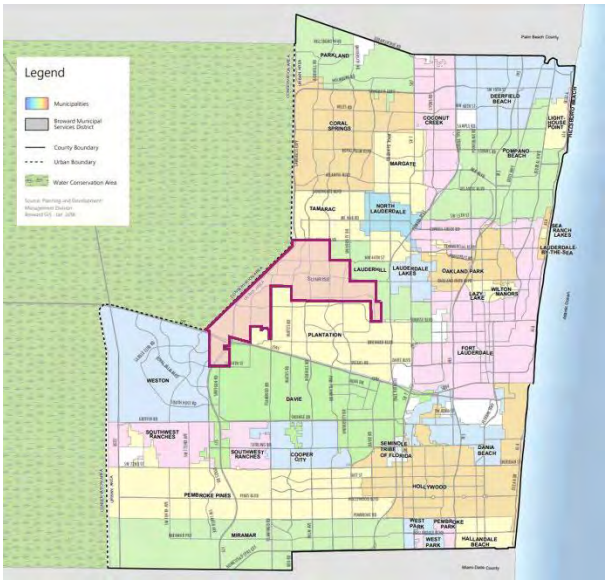
- Residential MSW: South Broward RRF
- Commercial MSW: South Broward RRF
- Residential Source Separated Recyclables: Reuter Recycling
- Commercial Source Separated Recyclables: Reuter Recycling
- C&D and White Goods: South Broward RRF

2.2.1.9 City of Sunrise

Municipality Characteristics

The City of Sunrise is located in central Broward County and has an area of approximately 18.1 square miles, as shown in **Figure 10**. The City had a population of 97,335 residents according to the 2020 Census, which is now estimated at approximately 102,964. The majority of housing units (55%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate of approximately 0.1 – 1.8% through 2045. The City currently generates an estimated 255,351 tons of waste per year.

Figure 10. The City of Sunrise



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with Republic Services on July 12, 2016 for the collection of MSW, yard trash, White Goods, C&D, and curbside recycling for residential properties. The same materials, except yard trash, are also collected for multi-family and commercial properties. This agreement is valid through September 30, 2024 with the option to renew for up to five additional one-year terms. The agreement includes termination for cause by either party.
  - An amendment was executed on December 13, 2016 to allow the contractor to modify the collection routes to increase efficiency.
  - A second amendment was executed on September 23, 2020 to allow the contractor to discontinue the recycling rewards program due to low participation, in exchange for financial contributions to City sustainability programs.
  - A third amendment was executed on November 14, 2023 for numerous changes, some of which are listed below:
    - Extend the collections services agreement by a five-year term through January 31, 2030.
    - Authorizes the contractor to collect source separated recyclables using the same vehicles used to collect MSW, as well as collect both MSW and source separated recyclables simultaneously, mixing them for the first renewal term for disposal at the South Broward RRF.
    - City will be responsible for program and outreach to increase public awareness on recyclable material contamination.
    - Added language regarding contractor's management of contaminated recyclable material.
    - Added language regarding future rate adjustments.
- The City entered into a disposal services agreement with Wheelabrator Environmental Systems Inc. on June 26, 2013, for receiving and disposal of solid waste into the South Broward RRF. This agreement is valid for a term of five years, with the option to renew for up to three additional five-year successive terms. This agreement also calls for an HHW collection event once per quarter in the City to be handled by South Broward RRF, which will collect HHW up until the $12,000 disposal fee cap is met. The agreement can be terminated by either party for cause.
  - An amendment was executed on April 22, 2014 to increase the level of services provided to City residents without additional payment to South Broward RRF from the City or residents. City residents will be able to deliver their yard trash, or White Goods to the facility during Saturdays between 8am and 4pm. The amendment also allows residents to deliver HHW to the facility on one Saturday per month between 8am and

4pm. An additional location in Fort Lauderdale is provided for E-waste to be delivered.

– A second amendment was executed on December 13, 2016 to revise the location where residents can drop off E-waste.

– A third amendment was executed on February 13, 2018 to modify the disposal fee, add a requirement for public records and modify the definition for disposal facilities for "additional waste" which are determined as below:

  - WM Recycling Sun 14 (WM Oakes Road) in Davie
  - WM Recycling Sun 2 facility in Pompano Beach
  - WM Recycling Sun 7 facility in Pompano Beach

– A fourth amendment was executed on May 23, 2023 to extend the services agreement for an additional 5-year term until July 2, 2028. The HHW collection disposal fee cap of $12,000 has been increased to $30,000, some modifications to disposal fees were made as well as removal of the option for residents to bring the previously allowed materials for drop off, except for E-waste to the South Broward RRF. The drop off E-waste at South Broward RRF is only to be once a month on designated days. The previous additional location for residents to drop off E-waste was removed.

Destination of Materials

The routing information that was reviewed was provided by the City and the Authority. The City provided the destination of materials as part of the data request, as follows:

- Residential MSW: South Broward RRF
- Commercial MSW: South Broward RRF
- Residential Source Separated Recyclables: Sent to South Broward RRF (as of the third amendment onward)
- Commercial Source Separated Recyclables: Envirocycle
- C&D and White Goods: WM Oakes Road

2.2.2 Medium ILA Members

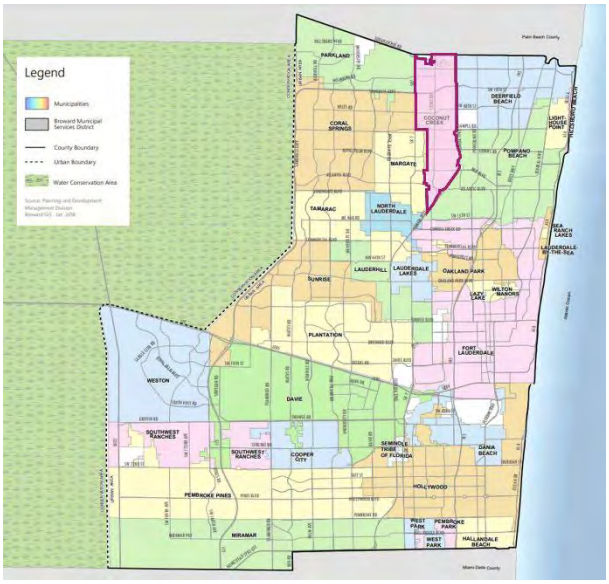
2.2.2.1 City of Coconut Creek

Municipality Characteristics

The City of Coconut Creek is located in northern Broward County and has an area of approximately 12 square miles, as shown in **Figure 11**. The City had a population of approximately 57,833 residents according to the 2020 census, which is now estimated at approximately 59,942 residents and more than 1,400 businesses. Housing is split between single-family (43%) homes and multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City

population (and housing) is expected to increase at an annual rate of approximately 0.4 – 2.2% through 2045. The City currently generates an estimated 148,656 tons of solid waste per year.

Figure 11. The City of Coconut Creek



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- Coconut Creek entered into an agreement with Republic Services on October 1, 2019, for the residential and commercial collection of MSW, recycling, White Goods, and C&D. This agreement is valid until September 30, 2026, with the option to renew for one additional five-year term.
  - An amendment was agreed upon in 2021 to amend the recycling contract and allow for recyclable materials to be comingled with garbage. This eliminated the curbside recycling collection, and the City has created two drop off locations for recyclable materials.
- The City entered into a renewed ILA agreement with Broward County on October 28, 2021 for disposal services at the waste-to-energy facility for MSW, White Goods, yard trash and C&D and is valid through July 2028.

Destination of Materials

The following discusses the routing of materials collected in the City of Coconut Creek to solid waste disposal or recycling facilities. The routing of materials information was determined from review of collection and disposal contracts, the municipality website or the summary table developed by Broward SWRS:

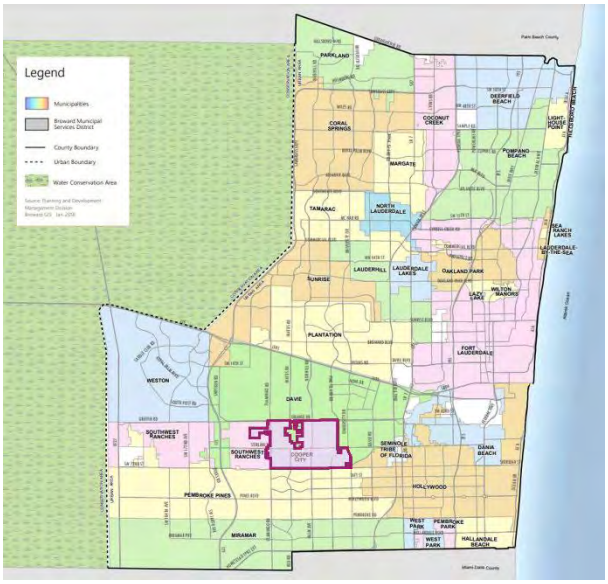
- Residential MSW: WM Recycling Deerfield or alternatively the South Broward RRF as per the ILA agreement.
- Commercial MSW: WM Recycling Deerfield or alternatively the South Broward RRF as per ILA agreement.
- Residential Source Separated Recyclables: Resident drop-off facilities which routes glass to strategic materials in Sarasota. The Broward SWRS summary indicates that recyclables are sent to the WM Recycling Deerfield facility or alternatively the WM Davie facility.
- Commercial Source Separated Recyclables: Privately collected, assumed to go to WM Recycling Deerfield based on distance from the City.
- C&D and White Goods: Waste Connections Deerfield or alternatively the South Broward RRF as per ILA agreement.

2.2.2.2 City of Cooper City

Municipality Characteristics

The City of Cooper City is located in southern Broward County and has an area of approximately 8.3 square miles, as shown in **Figure 12**. The City had a population of approximately 34,401 residents according to the 2020 census, which is now estimated at approximately 35,284 residents. Housing is almost entirely (94%) single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City population is expected to increase slightly for several years, then slightly decline at approximately 0.1% a year into 2045, the near future. The City currently generates an estimated 87,503 tons of solid waste per year.

Figure 12. The City of Cooper City



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with Coastal Waste & Recycling of FL on January 9, 2024, for the collection of MSW and recyclables. This agreement is valid for seven years with the option to renew for one additional seven-year term. The agreement includes a termination for convenience clause, with 30 days' written notice, and the City would compensate the contractor against any resulting loss, up to the maximum full contracted fee amount. In the case of termination, the contractor would continue to provide collection services to the City for up to 180 days while the City transitions to another vendor.

- The City entered into an agreement with Eastern Waste Systems on January 9, 2024, for residential bulk waste and white goods collection. This agreement is valid for seven years with the option to renew for one additional seven-year term. The agreement includes a termination for convenience clause, with 30 days' written notice, and the City would compensate the contractor against any resulting loss up to the maximum full contracted fee amount. In the case of termination, the contractor would continue to provide collection services to the City for up to 180 days while the City transitions to another vendor.

- The City entered into a single stream recycling services agreement with WM on September 12, 2023, for receiving recyclables at the WM Oakes Road facility. This agreement is valid for five years with the option to renew for two additional one-year terms.

- The City also entered into an optional services agreement with Wheelabrator Environmental Systems on December 13, 2016 for residents to drop off household hazardous waste at the Broward County South RRF location. The original agreement was valid through July 3, 2018, and included three additional five-year renewal terms, through 2031.

Destination of Materials

The following discusses the routing of materials from the City of Cooper City to the various solid waste and recycling facilities. The routing of materials information was confirmed by the city below:

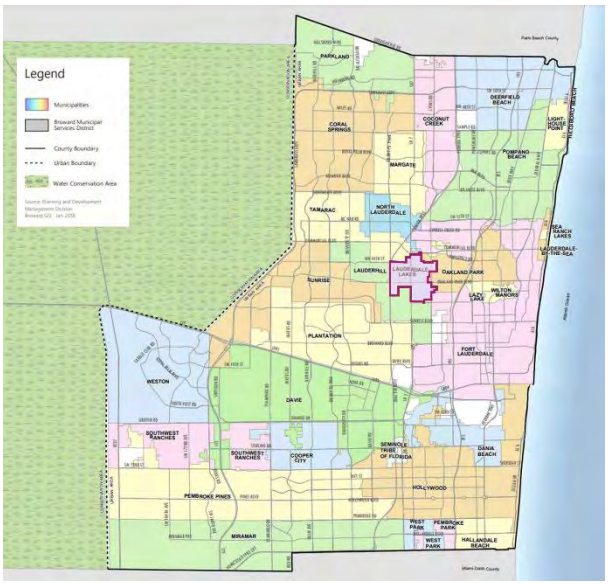
- Residential MSW: Broward County South RRF
- Commercial MSW: Broward County South RRF
- Residential Source Separated Recyclables: WM Davie Transfer Station (Sun 12) or Reuter Recycling
- Commercial Source Separated Recyclables: Open Market, assumed to go to Reuter Recycling
- C&D, Bulk waste, and White Goods: WM Oakes Road

2.2.2.3 City of Lauderdale Lakes

Municipality Characteristics

The City of Lauderdale Lakes is located in central Broward County and has an area of approximately 3.6 square miles, as shown in **Figure 13**. The City had a population of approximately 35,954 residents according to the 2020 census, which is now estimated at approximately 35,313. The majority of housing units (32%) are multifamily dwellings (i.e., condominiums, townhouses, etc.) with the remainder as single-family homes. Current projections indicate the City's population is expected to initially remain stable and then decrease at an annual rate of approximately 0.15% through 2045. The City currently generates an estimated 87,577 tons of waste per year.

Figure 13. The City of Lauderdale Lakes



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of their active collection and disposal agreements:

- The City entered into an agreement with WM on December 9, 2009 for the collection of MSW, White Goods, and curbside recycling. The duration of the agreement term and a termination clause in the agreement were not apparent.
  - A first addendum was executed in 2013, however, the details of which are not readily available.
  - A second addendum, executed in October 2019, increased the frequency of White Goods pickup, adjusted the CPI cap, and added a recycling processing agreement and protocol for overfilled residential containers, among other changes.

- The City executed a recyclables processing services agreement with WM on July 11, 2023, for receiving recyclables at either the WM Davie Transfer Station, WM Deerfield Recycling facility, South Broward RRF or another facility as directed by WM. This agreement is valid for five years, with the option to renew for two additional one-year term(s). A termination for cause clause allows either party to terminate the contract by cause with 120 days written notice.

Destination of Materials

The Routing information reviewed was provided by the City, and the Authority. The destination of materials was provided by the City as part of the data request as follows:

- Residential MSW: WM Recycling – Deerfield or South Broward RRF
- Commercial MSW: WM Recycling – Deerfield or South Broward RRF
- Residential Source Separated Recyclables: WM Deerfield Recycling, or other facility directed by WM
- Commercial Source Separated Recyclables: WM Deerfield Recycling, or other facility directed by WM
- C&D and White Goods: C&D Assumed to go to WM Oakes Road, with Bulky Waste and Yard Waste sent to South Broward RRF

2.2.2.4 City of Margate

Municipality Characteristics

The City of Margate is located in north-central Broward County and has an area of approximately 9.0 square miles, as shown in **Figure 14**. The City had a population of 58,712 residents according to the 2020 Census, which is now estimated at approximately 58,750. The majority of housing units (59%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to remain generally stable until approximately 2036 and then increase at an annual rate of approximately 0.3 - 0.8% through 2045. The City currently generates an estimated 145,700 tons of waste per year.

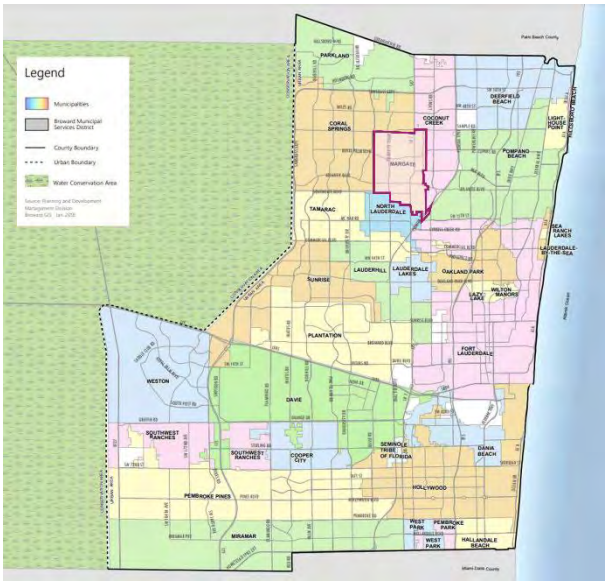
Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with Republic Services on February 1, 2022 for the collection of residential MSW and curbside recycling. This agreement is valid until September 30, 2029, with the option to renew for two additional two-year terms. A termination clause would allow the City to terminate the contract only by contractor's failure with 90 days written notice.

- The city entered into a yard trash processing services agreement with Wheelabrator on June 26, 2012, for sending waste to the South Broward RRF. This agreement has a five-year term, with the option to renew for three additional five-year terms.

Figure 14. The City of Margate



Destination of Materials

Based on review of information provided by the Authority as well as available contract and online information, waste materials collected are assumed to be routed to receiving facilities as follows:

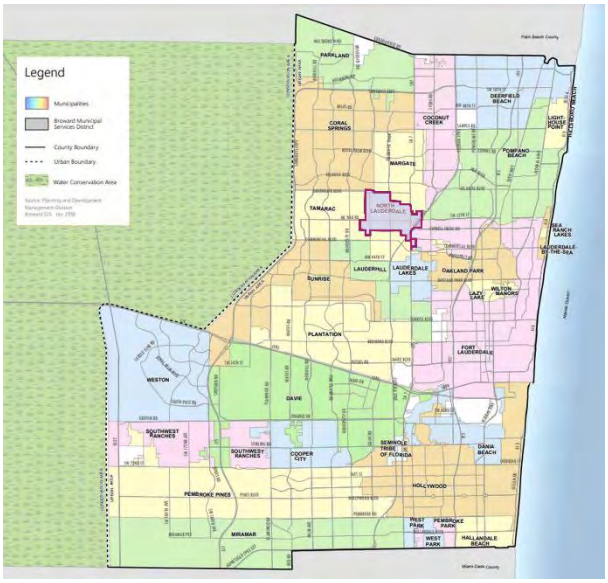
- Residential MSW: South Broward RRF
- Commercial MSW: South Broward RRF
- Residential Source Separated Recyclables: South Broward RRF
- Commercial Source Separated Recyclables: South Broward RRF
- C&D and White Goods: South Broward RRF for White Goods

2.2.2.5 City of North Lauderdale

Municipality Characteristics

The City of North Lauderdale is located in north-central Broward County and has an area of approximately 4.6 square miles, as shown in **Figure 15**. The City had a population of 44,794 residents according to the 2020 Census, which is now estimated at approximately 43,287. The majority of housing units (69%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to decrease at an annual rate of approximately 0.1 - 1% through 2045. The City currently generates an estimated 107,353 tons of waste per year.

Figure 15. The City of North Lauderdale



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with WM on July 13, 2021 for the collection of MSW, White Goods and recycling. This agreement is valid for seven years through December 31, 2028, with the option to renew for one additional three-year term. Early contract termination would only occur should the contractor fail to abide by the agreement.
  - An amendment was executed on February 28, 2023, to add curbside collection and disposal services for mobile home parks at the residential collection rates.

Destination of Materials

Based on review of information provided by the Authority as well as available contract and online information, waste materials collected are assumed to be routed to receiving facilities as follows:

- Residential MSW: South Broward RRF or Monarch Hill Landfill
- Commercial MSW: South Broward RRF or Monarch Hill Landfill
- Residential Source Separated Recyclables: South Broward RRF
- Commercial Source Separated Recyclables: South Broward RRF
- C&D and White Goods: WM Recycling Deerfield

2.2.2.6 City of Oakland Park

Municipality Characteristics

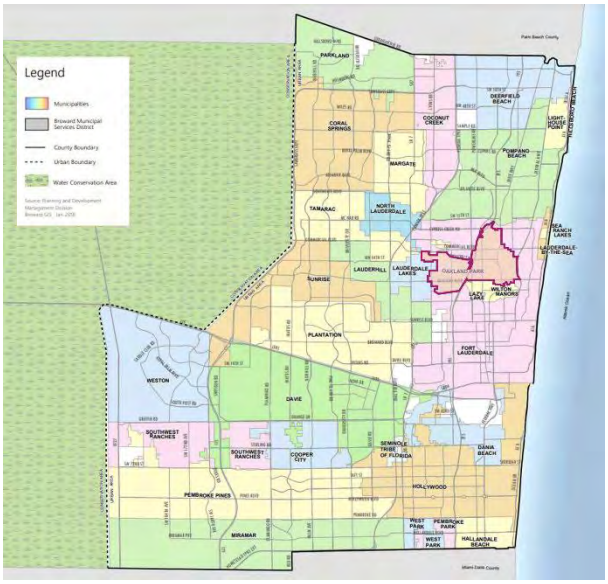
The City of Oakland Park is located in central Broward County and has an area of approximately 8.1 square miles, as shown in **Figure 16**. The City had a population of 44,229 residents according to the 2020 Census, which is now estimated at approximately 45,545. The majority of housing units (62%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate of approximately 0.1 – 1% through 2045. The City currently generates an estimated 112,953 tons of waste per year.

Collection and Disposal Contracts

The City provides its own residential and commercial garbage and recycling collection services. However, one contract described below was provided by the Authority as part of the June 2024 data request.

- The City entered into an ILA agreement with Broward County on an unknown date for Oakland Park residents to drop off yard trash, White Goods, HHW and E-waste at County maintained residential drop-off centers. This agreement is valid through September 30, 2026, with the option to renew for three additional one-year terms. A termination clause would allow the city or county to terminate the agreement for convenience with 30 days' written notice.

Figure 16. The City of Oakland Park



Destination of Materials

Routing information reviewed was provided by the City, and the Authority. The destination of materials was provided by the City as part of the data request as follows:

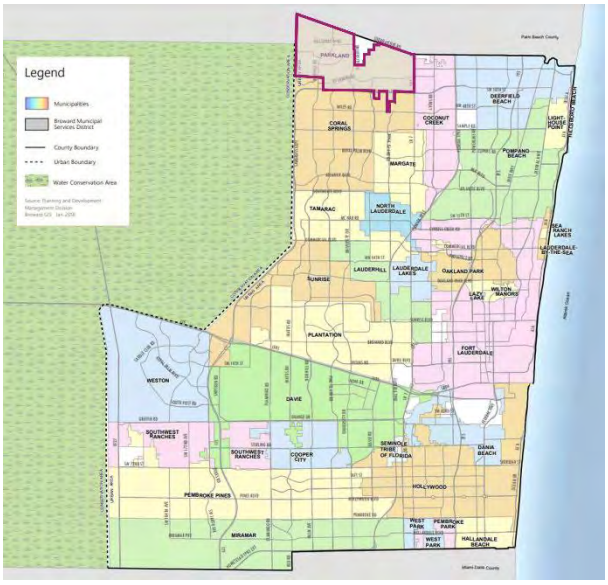
- Residential MSW: Waste Connections of Florida – Deerfield Beach R&T
- Commercial MSW: Waste Connections of Florida – Deerfield Beach R&T
- Residential Source Separated Recyclables: WM Recycling Deerfield
- Commercial Source Separated Recyclables: WM Recycling Deerfield
- C&D (Not collected) and White Goods: WM Recycling Deerfield

2.2.2.7 City of Parkland

Municipality Characteristics

The City of Parkland is located in northern Broward County and has an area of approximately 12.8 square miles, as shown in **Figure 17**. The City had a population of 34,670 residents according to the 2020 Census, which is now estimated at approximately 37,365. Housing is comprised almost entirely (94%) of single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to initially increase at an annual rate of approximately 0.75% and then decrease at an annual rate of approximately 0.07% and stabilize through 2045. The City currently generates an estimated 92,660 tons of waste per year.

Figure 17. The City of Parkland



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City originally entered into an agreement with WM in 2008 and an amended and restated agreement on April 21, 2010, for the collection of residential and commercial MSW, yard trash, White Goods, and curbside recycling. This agreement is valid from October 2010 through September 2018 with the option to renew for three additional five-year terms. Early contract termination would only occur should the contractor fail to abide by the agreement.
  - An amendment was executed on July 10, 2019, to extend the contract through September 30, 2024. It was noted that there was an ordinance previously passed that extended the original contract term for an additional year from 2018 to 2019.
  - An amendment was executed on June 17, 2024, to extend the contract from October 1, 2024 through September 30, 2029, along with changes to rates. This amendment also included a termination clause, with nine months' written notice to the contractor.

Destination of Materials

Routing information reviewed was provided by the City, and the Authority. The destination of materials was provided by the City as part of the data request as follows:

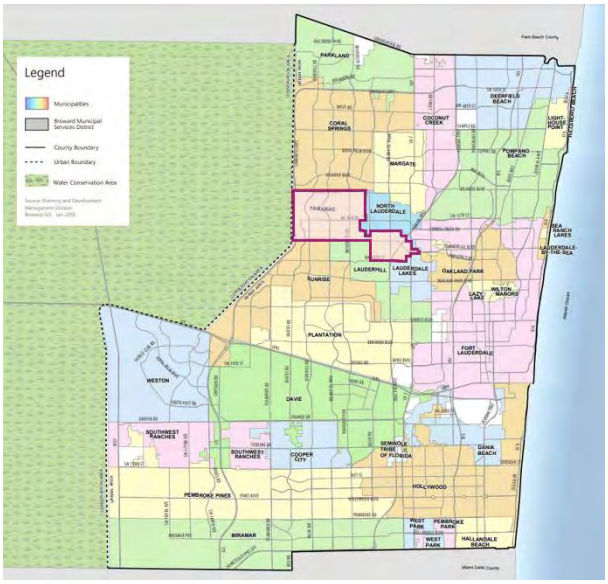
- Solid Waste: Monarch Hill Landfill
- Recyclables: WM Recycling Deerfield
- C&D: WM Recycling Deerfield
- Bulk Waste/White Goods: Monarch Hill Landfill

2.2.2.8 City of Tamarac

Municipality Characteristics

The City of Tamarac is located in central Broward County and has an area of approximately 12.1 square miles, as shown in **Figure 18**. The City had a population of 71,897 residents according to the 2020 Census, which is now estimated at approximately 73,117. The majority of housing units (56%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate of approximately 0.1 – 0.3% through 2045. The City currently generates an estimated 181,330 tons of waste per year.

Figure 18. The City of Tamarac



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with WM on June 26, 2024 for the collection of residential and multi-family MSW, recovered materials, yard trash, White Goods, and recycling as well as commercial MSW and White Goods collection. This agreement is valid for seven years through September 30, 2031, with the option to renew for one additional three-year term. A termination clause would allow the City to terminate the contract for convenience with 180 days' written notice.

- The City approved a renewal for the agreement with Clean Harbors on October 26, 2022 for the collection and disposal of household hazardous waste and E-Waste. However, the term or end date was not made clear in the provided contract resolution.

Destination of Materials

Routing information reviewed was provided by the City, and the Authority. The destination of materials was provided by the City as part of the data request as follows:

- Residential MSW: Broward South RRF
- Commercial MSW: Broward South RRF
- Residential Source Separated Recyclables: WM Recycling Deerfield
- Commercial Source Separated Recyclables: WM Recycling Deerfield or Reuter Recycling
- C&D and White Goods: WM Deerfield (Sun 2)

2.2.2.9 City of Weston

Municipality Characteristics

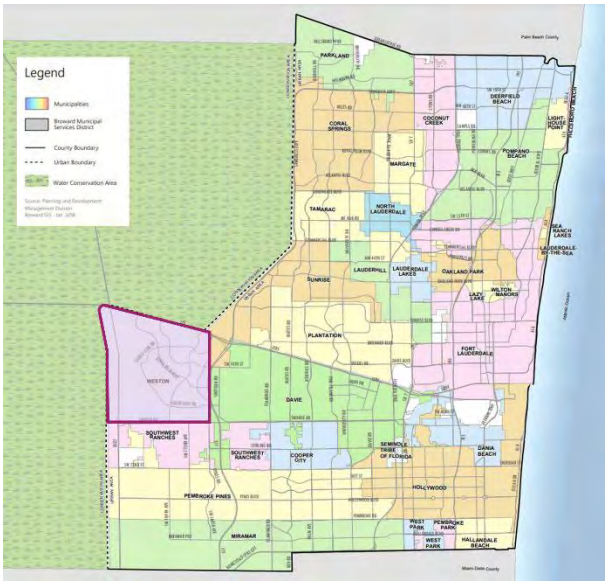
The City of Weston is located in west-central Broward County and has an area of approximately 26.1 square miles, as shown in **Figure 19**. The City had a population of 68,107 residents according to the 2020 Census, which is now estimated at approximately 68,242. The majority of housing units (79%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to decrease at an annual rate of approximately 0.1% through 2045. The City currently generates an estimated 169,240 tons of waste per year.

Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with Republic Services of Florida on March 5, 2024 for the collection of MSW, White Goods, and curbside recycling. This agreement is valid for five years through March 31, 2029, with the option to renew for one additional five-year term. The agreement includes a termination for convenience clause, with 30 days' written notice by action of the City commission and the City manager. The agreement can also be terminated for cause.

Figure 19. The City of Weston



Destination of Materials

By agreement with the City, the contractor is responsible for the collection and disposal services of all solid waste (except construction demolition debris) and recycling. Therefore, the destination of all

materials, including recycling, is determined by the contractor and is at the contractor's discretion. For the purposes of modeling the waste flow, the destination of Reuter Recycling provided by the Authority will be assumed.

2.2.3 Small ILA Members

2.2.3.1 Broward Municipal Services District

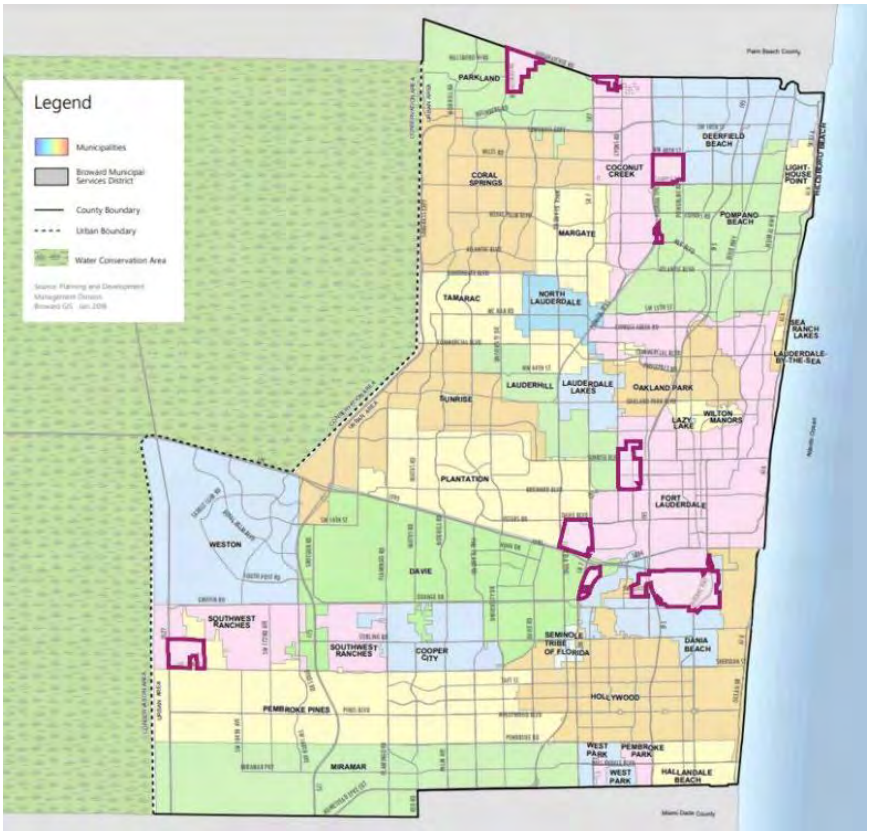
Service Area Characteristics

The Broward Municipal Services District (BMSD) has an area of approximately 11.4 square miles, as shown in **Figure 20**. The BMSD had a population of 15,462 residents according to the 2020 Census, which is now estimated to be approximately 15,556. The BMSD consists of unincorporated County areas and seven neighborhoods, as follows:

- Boulevard Gardens
- Broadview Park
- Franklin Park
- Hillsboro Pines
- Hillsboro Ranches
- Roosevelt Gardens
- Washington Park

Housing units in the BMSD are predominately single-family homes (>95%) with some multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the BMSD population is expected to increase at an annual rate of approximately 0.1 - 1% through 2045. The BMSD currently generates an estimated 38,579 tons of waste per year.

Figure 20. Broward Municipal Services District

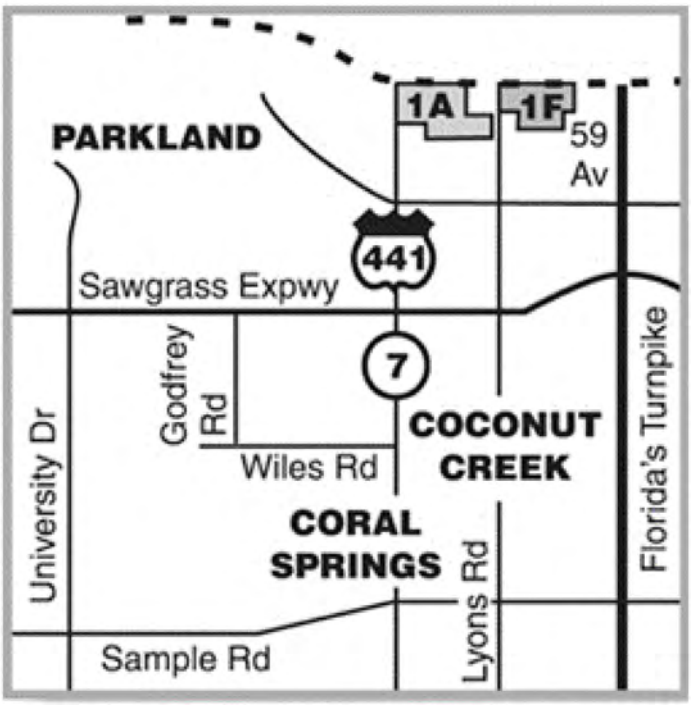


Collection and Disposal Contracts

Routing information reviewed was provided by the City, and the Authority. The City provided the destination of materials as part of the data request as follows: Broward County manages waste and recycling services for the BMSD, formerly known as Unincorporated Broward County. Contracts for collection and disposal were not provided for the BMSD as part of the June 2024 data request. However, based on review of the summary table prepared by Broward SWRS, as well as the SWRS website[1], Republic Service provides collection and disposal for service areas 1A and 1F, depicted in **Figure 21** below.

[1] 2024Web-ServiceSchedule.pdf (broward.org)

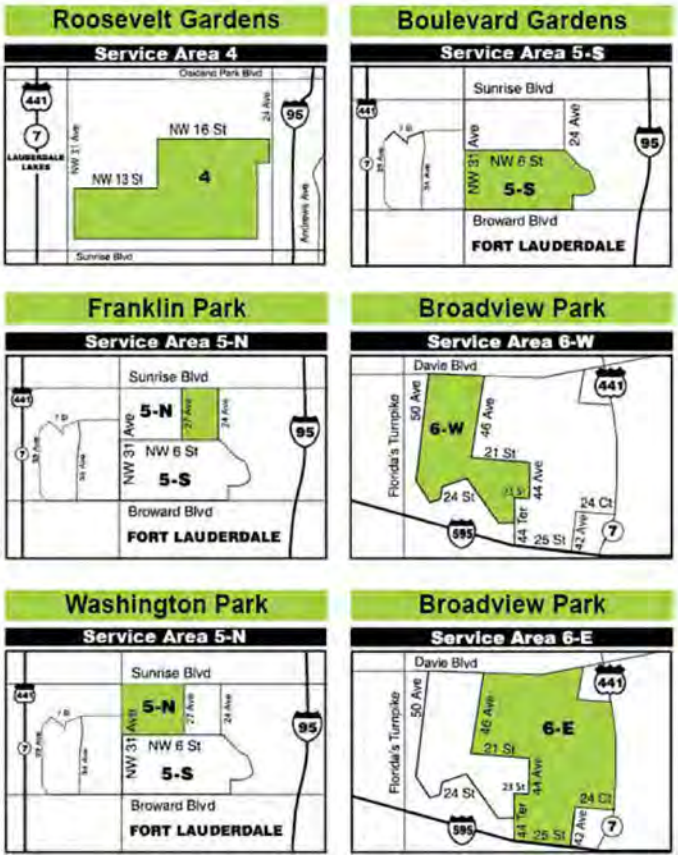
Figure 21. Republic Service's Service Area



Also listed on the Broward SWRS website is Coastal Waste & Recycling of FL[2], which provides collection and disposal for service areas 4, 5, and 6, depicted in **Figure 22** below.

[2] Unincorporated Residential Collection Schedule (broward.org

Figure 22. Coastal Waste & Recycling Service



In addition to the above, some municipalities provided for the collection of solid waste in BMSD areas located near their municipal boundaries. The City of Coconut Creek has an ILA with the County and entered into a contract with Republic Services on October 1, 2019, which provides services to the unincorporated Hillsboro Pines and Hillsboro Ranches neighborhoods (approximately 190 homes).

Destination of Materials

The following discusses the routing of materials collected in the BMSD and was determined based on review of the City of Coconut Creek contract and review of the summary table developed by Broward SWRS.

- Residential MSW (Collected through the City of Coconut Creek Contract): May possibly go to WM Recycling Deerfield, otherwise assumed to go to South Broward RRF
- Commercial MSW (Collected through the City of Coconut Creek Contract): May possibly go to WM Recycling Deerfield, otherwise assumed to go to South Broward RRF
- BMSD Residential MSW (Collected by Republic Services and Coastal Waste & Recycling): South Broward RRF

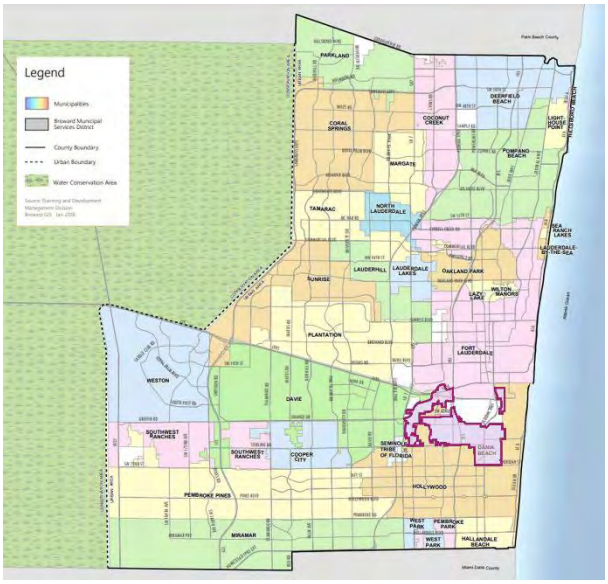
- BMSD Commercial MSW (Collected by Republic Services and Coastal Waste & Recycling): South Broward RRF
- BMSD Residential Source Separated Recyclables: Coastal Waste & Recycling #4 in Pompano
- BMSD Commercial Source Separated Recyclables: Open market, but assumed to go to Coastal Waste & Recycling #4 in Pompano
- BMSD C&D and White Goods: WM Oakes Road

2.2.3.2 City of Dania Beach

Municipality Characteristics

The City of Dania Beach is located in southern Broward County and has an area of approximately 8.3 square miles, as shown in **Figure 23**. The City had a population of approximately 31,723 residents according to the 2020 census, which is now estimated at approximately 32,542. The majority (about 62%) of housing consists of single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate of approximately of 0.35 - 3% through 2045. The City currently generates an estimated 80,704 tons of waste per year.

Figure 23. The City of Dania Beach



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City of Dania Beach's active collection and disposal agreements:

- The City entered into an agreement with WM on December 1, 2015 for the collection of MSW, Recycling and White Goods. This agreement is valid for seven years with the option to renew for two additional five-year terms. A termination for convenience clause allows the City to terminate the contract for convenience with 30 days' written notice, and the City would compensate the contractor for any work performed prior to termination.

  – An amendment was executed on November 5, 2021 to authorize the first seven-year renewal term, made adjustments to rates, as well as noted the WM Davie Transfer Station as the designated facility for residential recycling and the South Broward RRF for residential MSW.

Destination of Materials

The following discusses the routing of materials from the City of Dania Beach to the various solid waste and recycling facilities. Routing information reviewed was provided by the City, and the Authority. The destination of materials was provided by the City as part of the data request as follows:

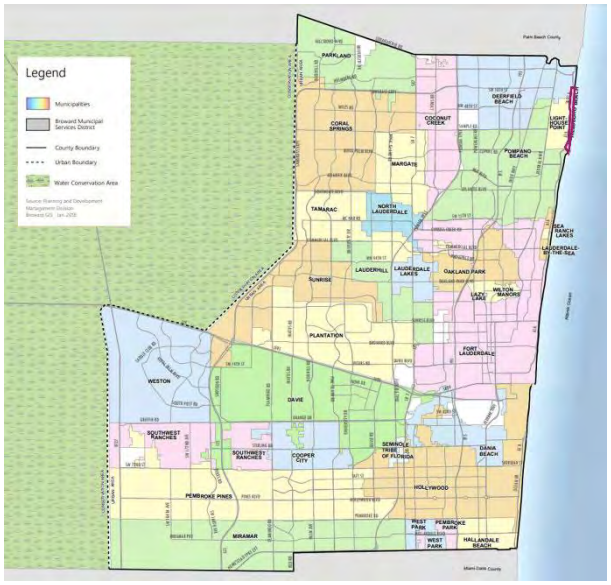
- Residential MSW: Sent to Broward County South RRF
- Commercial MSW: Privately collected, City assumed it goes to Broward County South RRF based on distance from the City to the facility
- Residential Source Separated Recyclables: Sent to WM Davie Transfer Station
- Commercial Source Separated Recyclables: Privately collected, City assumed it goes to WM Recycling - Davie based on distance from the City to the facility.
- C&D and White Goods: WM Recycling – Dania Beach for Bulk waste, C&D is privately collected

2.2.3.3 Town of Hillsboro Beach

Municipality Characteristics

The Town of Hillsboro Beach is located in northern Broward County and has an area of approximately 1.5 square miles, as shown in **Figure 24**. The Town had a population of approximately 1,987 residents according to the 2020 census, which is now estimated at approximately 2,179. The majority of housing units (89%) are multifamily dwellings (i.e., condominiums, townhouses, etc.) with the remainder as single-family homes. Current projections indicate the Town's population is expected to decrease at an annual rate of approximately 0.1 -0.4% through 2045. The Town currently generates an estimated 5,404 tons of waste per year.

Figure 24. The Town of Hillsboro Beach



Collection and Disposal Contracts

Contracts for collection and disposal were not provided by the Authority as part of the June 2024 data request. However, review of the municipality website shows the Town has an agreement with Waste Pro that services MSW, curbside recycling, yard trash and White Goods. Details associated with the Waste Pro services contract are unknown until the contract is made available.

Destination of Materials

Contracts for collection and disposal were not provided by the Authority as part of the data request. However, destination of materials from the Town of Hillsboro Beach collected by Waste Pro were determined by review of the summary table developed by Broward SWRS,

- Solid Waste: Deerfield Beach Recycling and Transfer
- Recycling: WM Recycling- Deerfield or Davie
- C&D and White Goods: Assumed to be routed to WM Oakes Road

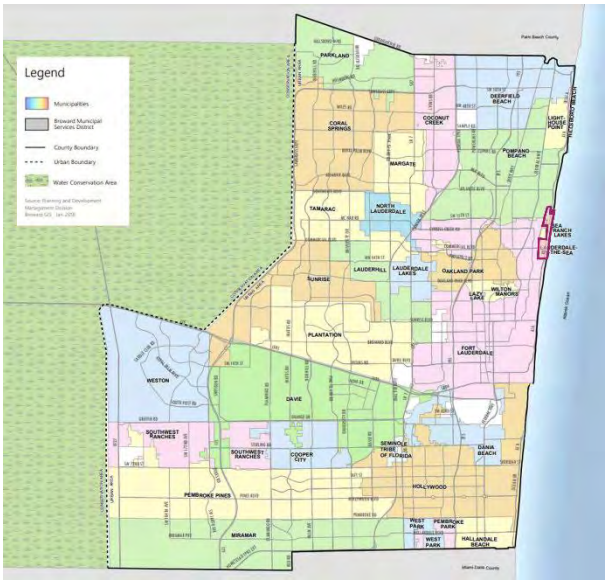
2.2.3.4 Town of Lauderdale-by-the-Sea

Municipality Characteristics

The Town of Lauderdale-by-the-Sea is located in central Broward County and has an area of approximately 1.6 square miles, as shown in **Figure 25**. The Town had a population of approximately 6,198 residents according to the 2020 census, which is now estimated at approximately 6,532. The majority of housing units (73%) are multifamily dwellings (i.e., condominiums, townhouses, etc.) with the remainder as single-family homes. Current projections indicate the Town's population is expected

to decrease at an annual rate of approximately 0.2 – 0.3% through 2045. The Town currently generates an estimated 16,200 tons of waste per year.

Figure 25. The Town of Lauderdale-By-The-Sea



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the Town's active collection and disposal agreements:

- The Town entered into a restated agreement with Waste Pro on November 1, 2021 for the collection of MSW, White Goods and recycling. This third renewal agreement provides services through October 31, 2026, with no clear terms for additional renewals. The agreement would only be terminated by determination of breach.

Destination of Materials

Destination of materials from the Town of Lauderdale-by-the-Sea were not found in the collection and disposal contracts, and were not readily available on the municipal website, therefore, the destination of materials from the Town were determined by review of the summary table developed by Broward SWRS:

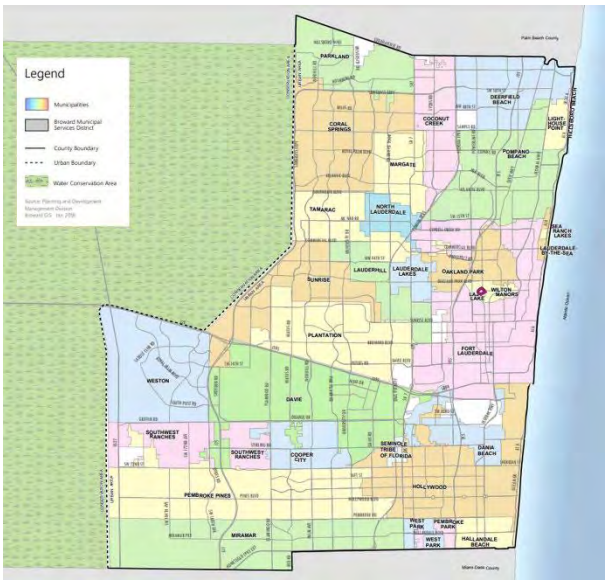
- Solid Waste: Deerfield Beach Transfer and Recycling
- Recyclables: WM Recycling – Deerfield or Davie
- C&D and White Goods: Assumed to go to Deerfield Beach Transfer and Recycling

2.2.3.5 Village of Lazy Lake

Municipality Characteristics

The Village of Lazy Lake is located in central Broward County and has an area of approximately 0.02 square miles, as shown in **Figure 26**. According to the 2020 Census, the Village had a population of 33 residents; this has been estimated to have slightly decreased. Housing is comprised entirely of single-family homes. Current projections indicate the Village's population is expected to remain steady through 2045. The Village currently generates an estimated 62 tons of waste per year.

Figure 26. The Village of Lazy Lake



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the Village's active collection and disposal agreements:

- The Village entered into an agreement with Coastal Waste & Recycling of FL on December 15, 2023, for the collection of MSW, White Goods, yard trash, C&D and recycling. This agreement is valid through September 30, 2030, with no clear option of renewal.

Destination of Materials

Destination of materials from the Village of Lazy Lake was not found in the collection and disposal contracts, and was not readily available on the municipal website, therefore, the destination of materials from the Town was determined by review of the summary table developed by Broward SWRS.

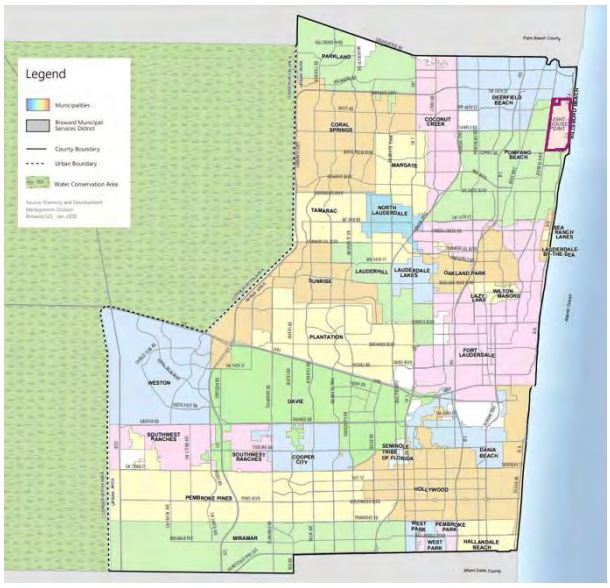
- Solid Waste: South Broward RRF
- Recyclables: Reuter Recycling

2.2.3.6 City of Lighthouse Point

Municipality Characteristics

The City of Lighthouse Point is located in northeast Broward County and has an area of approximately 2.4 square miles, as shown in **Figure 27**. The City had a population of 10,486 residents according to the 2020 Census, which is now estimated at approximately 10,613. The majority of housing units (70%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to decrease at an annual rate of approximately 0.05 – 0.15% through 2045. The City currently generates an estimated 26,319 tons of waste per year.

Figure 27. The City of Lighthouse Point



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with WM on March 26, 2024, for the collection of MSW, White Goods and curbside recycling. This agreement is valid for seven years through September 30, 2031, with the option to renew for two additional four-year terms. A termination for convenience clause allows the City to terminate the contract by convenience with 90 days written notice, and the City would compensate the contractor for satisfactory work up to the written termination date.

- The City entered an ILA with the County on July 9, 2024, to provide residents with HHW drop off locations. This agreement is valid through September 30, 2026, with the option to renew for three additional one-year terms.

- The City entered an ILA with the County on December 2, 2021 to send MSW, White Goods and yard trash to the South Broward RRF.

- The City entered into a recyclables processing services agreement with WM on September 13, 2023, for sending recyclables, MSW, Bulky and Yard waste to the WM Deerfield Recycling facilities. This agreement is valid for five years, with the option to renew for two additional one-year terms. A termination for cause clause allows either party to terminate the contract with 120 days written notice.

Destination of Materials

Routing information reviewed was provided by the City, and the Authority. The destination of materials was provided by the City as part of the data request as follows:

- Solid Waste: WM Deerfield
- Source Separated Recyclables: WM Deerfield
- C&D and White Goods: WM Deerfield

2.2.3.7 Town of Pembroke Park

Municipality Characteristics

The Town of Pembroke Park is located in southern Broward County and has an area of approximately 1.7 square miles, as shown in **Figure 28**. The Town had a population of 6,260 residents according to the 2020 Census, which is now estimated at approximately 6,838. The majority of housing units (60%) are multifamily dwellings, with the remainder single-family homes. Current projections indicate the Town's population is expected to initially decrease, then increase at an annual rate of approximately 1.15 – 3.3% through 2045. The Town currently generates an estimated 16,959 tons of waste per year.

Collection and Disposal Contracts

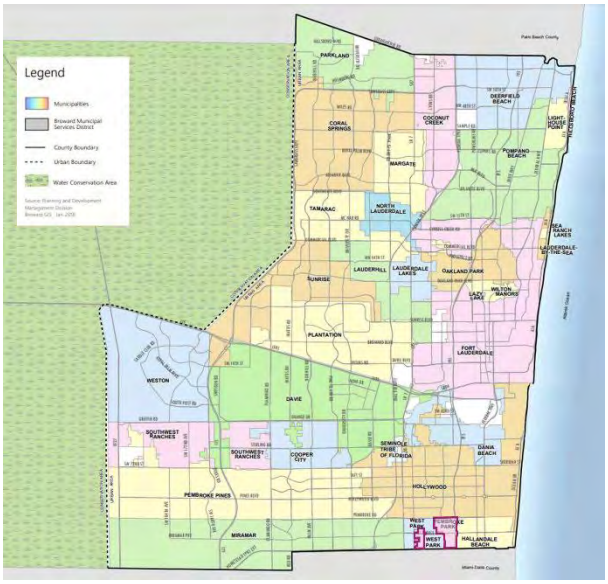
Contracts for collection and disposal were not provided by the Authority in response to the June 2024 data request. However, review of the municipality website shows the Town has an agreement with WM that services MSW, and White Goods. Details associated with the WM services contract are unknown until the contract is made available.

Destination of Materials

Contracts for collection and disposal were not provided by the Authority in response to the data request. However, routing for solid waste and recycling was determined by review of the summary table developed by Broward SWRS, and C&D/ Bulky Waste was assumed.

- Solid Waste: Pembroke Park Transfer and Recycling
- Recycling: Pembroke Park Transfer and Recycling
- C&D and White Goods: WM Recycling Dania Beach

Figure 28. The Town of Pembroke Park



2.2.3.8 Village of Sea Ranch Lakes

Municipality Characteristics

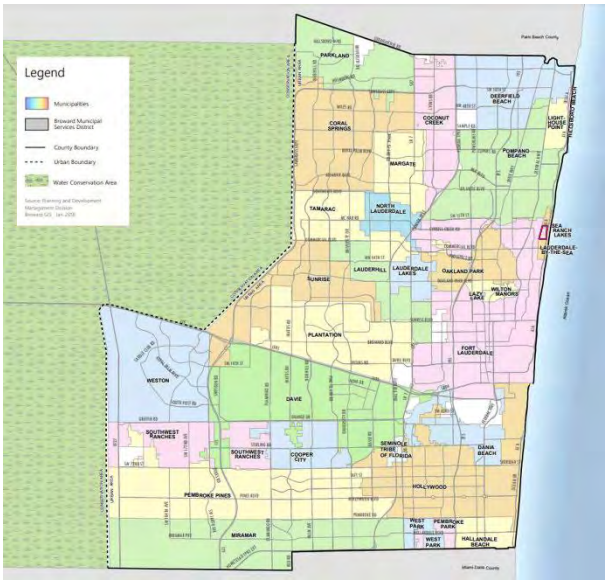
The Village of Sea Ranch Lakes is located in central Broward County and has an area of approximately 0.2 square miles, as shown in **Figure 29**. The Village had a population of 540 residents according to the 2020 Census, which is now estimated at approximately 389. The majority of housing units (94%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the Village's population is expected to decrease at an annual rate of approximately 0.1 - 0.4% through 2045. The Village currently generates an estimated 966 tons of waste per year.

Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the Village's active collection and disposal agreements:

- The Village entered into an agreement with WM on an unknown date for solid waste services. The original contract and the first three amendments were not provided in the June 2024 data request and were also not readily available on the Village website.
  - A fourth amendment to the original agreement was provided and executed by the Village and WM on February 7, 2022, for the collection of MSW, yard trash, White Goods and curbside recycling. This agreement is valid for three years through February 28, 2025, with the option to renew for an additional three-year term. The amendment did not include the previous agreements; therefore, it is unknown if any termination clauses exist.

Figure 29. The Village of Sea Ranch Lakes



Destination of Materials

The contracts provided did not include information related to the destination of materials collected. Destination of materials from the Village of Sea Ranch Lakes collected by WM were not readily available on their website, however the following destinations were assumed:

- Solid Waste: WM Recycling Deerfield
- Recycling: WM Recycling Deerfield
- C&D and White Goods: WM Recycling Deerfield

2.2.3.9 Town of Southwest Ranches

Municipality Characteristics

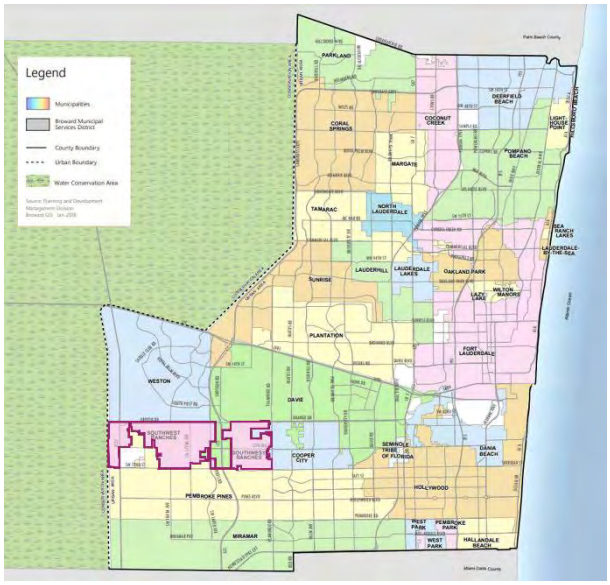
Southwest Ranches is situated in southern Broward County and has an area of approximately 13.0 square miles, as shown in **Figure 30**. The Town had a population of 7,607 residents according to the 2020 Census, which is now estimated at approximately 8,209. Housing consists entirely of single-family homes. Current projections indicate the Town's population is expected to have periods of decreasing and increasing populations at an annual rate of approximately -0.9 – 0.7%% through 2045. The Town currently generates an estimated 20,358 tons of waste per year.

Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the Town's active collection and disposal agreements:

- The Town entered into an agreement with WM on July 28, 2022, for the collection of MSW, White Goods, yard trash and curbside recycling. This agreement is valid for eight years through September 30, 2030, with the option to renew for three additional one-year terms. The agreement can be terminated for cause.

Figure 30. The Town of Southwest Ranches



Destination of Materials

Routing information reviewed was provided by the Town, and the Authority. The destination of materials was provided by the Town as part of the data request as follows:

- Residential MSW: Reuter MRF
- Commercial MSW: Reuter MRF
- Residential Source Separated Recyclables: Reuter MRF
- Commercial Source Separated Recyclables: Reuter MRF
- C&D and White Goods: Reuter MRF

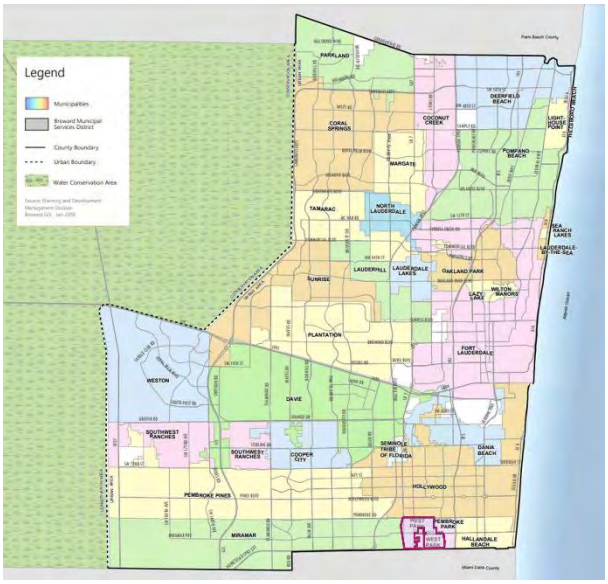
2.2.3.10 City of West Park

Municipality Characteristics

The City of West Park is located in southern Broward County and has an area of approximately 2.3 square miles, as shown in **Figure 31**. The City had a population of 15,130 residents according to the 2020 Census, which is now estimated at approximately 14,582. The majority of housing units (94%) are single-family homes, with the remainder as multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to decrease at an

annual rate of approximately 0.1 – 0.2% through 2045. The City currently generates an estimated 36,164 tons of waste per year.

Figure 31. The City of West Park



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- The City entered into an agreement with Waste Pro on October 18, 2010, for the collection of MSW, yard trash, White Goods, and curbside recycling. This agreement was valid for five years through December 31, 2015, with the option to renew for one to five year term, followed by another one to five year term, after which the agreement can be extended upon mutual agreement. The agreement could be terminated for cause.

  – An amendment was executed on October 30, 2013, to reflect the decrease in the monthly rate for solid waste disposal services provided by the contractor and an increase in the annual franchise fee paid by the contractor.

  – A second amendment was executed on December 1, 2015 to renew the agreement for the following:

    - Renewal for an additional five-year term, with the option of later renewing for an additional one to five-years with the option of an additional subsequent renewal for a minimum of one year.

    - Added service of commercial curbside recycling collection for City businesses and provides 96 Gallon recycling containers.

- Added the intent of the contractor to implement a HHW program to replace the existing ILA HHW agreement between the City and Broward County.

- Adjustments so that the contractor will pay for certain costs relating to amendment preparation, providing for a reduction to an irrevocable one million dollar bond to be paid by the contractor.

– A third amendment was executed on November 19, 2020 for the following:

- Renewal for an additional five-year term through December 31, 2025, with the option of later renewing for an additional one to five years with the option of an additional subsequent renewal for a one- to five-year term.

- The contractor will maintain the existing service rates and the City will be responsible for the billing and collection of payments for all residential curbside accounts with the exception of additional services.

- The contractor will be responsible for the proposal costs and agrees to pay $75,000 for exclusive operation of residential waste collection services in the City.

– An amendment was executed on January 20, 2022, to extend the timeline for Waste Pro to replace all of the garbage carts from the original date of October 31, 2021 to May 22, 2022.

Destination of Materials

Destination of materials from the City of West Park were not found in the collection and disposal contracts, and were not readily available on the municipal website, therefore, the destination of materials from the City were determined by review of the summary table developed by Broward SWRS:

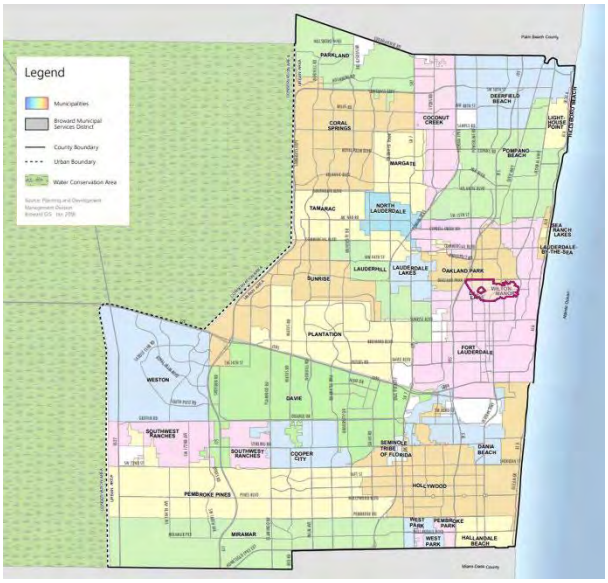
- Solid Waste: South Broward RRF
- Recyclables: Reuter Recycling
- C&D/White Goods: WM Oakes Road

2.2.3.11 City of Wilton Manors

Municipality Characteristics

The City of Wilton Manors is located in central Broward County and has an area of approximately 2.0 square miles, as shown in **Figure 32**. The City had a population of 11,426 residents according to the 2020 Census, which is now estimated at approximately 11, 585. Housing is almost equally split between single-family homes (62%) and multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to have a higher initial increase, at approximately 4%, until 2030 and then an annual rate of approximately 0.3 – 1.2% through 2045. The City currently generates an estimated 28,731 tons of waste per year.

Figure 32. The City of Wilton Manors



Collection and Disposal Contracts

Based on the information provided by the Authority in response to the data request, the following is a brief summary of the City's active collection and disposal agreements:

- An agreement was provided; however, specific contract details aside from term dates and term renewals were not readily available in the agreement. The City entered into an agreement with Coastal Waste & Recycling of FL on September 12, 2023, for unspecified solid waste services. The municipal website indicates MSW, White Goods and curbside recycling collections are performed. This agreement is valid for three years, through September 30, 2026, with the option to renew for up to two additional two-year terms. The City confirmed that there is a termination clause with 60 days' notice required. The municipal website indicates that residents can arrange for Coastal to pick up HHW at the doorstep of residences.

Destination of Materials

Destination of materials from the City of Wilton Manors were not found in the collection and disposal contracts. However, the destination of materials was provided by the City as part of the data request:

- Residential MSW: Broward South RRF
- Commercial MSW: Broward South RRF
- Residential Source Separated Recyclables: WM Recycling Deerfield
- Commercial Source Separated Recyclables: Coastal Waste & Recycling #4
- C&D and White Goods: WM Deerfield (Sun 11)

2.2.4 Non-ILA Members

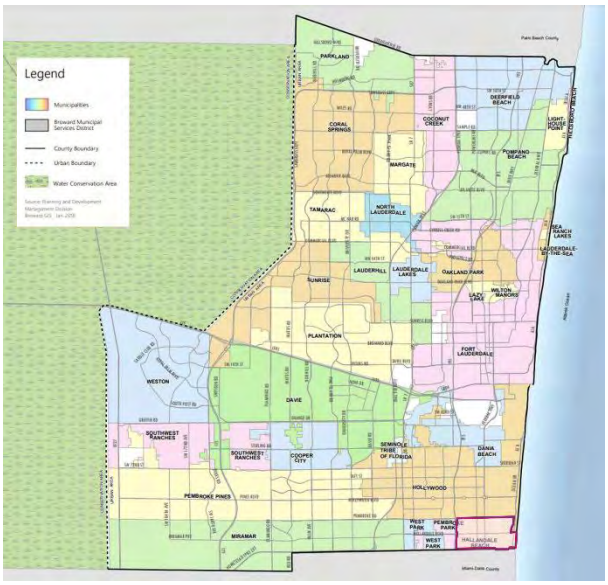
The City of Hallandale Beach, Pembroke Pines, Pompano Beach, and the Hollywood Seminole Indian Reservation are currently not part of the Authority. However, because these entities may send their waste to Authority facilities, their populations and waste generation rates were considered when evaluating the solid waste processing and disposal needs of the Authority.

2.2.5 City of Hallandale Beach

Municipality Characteristics

The City of Hallandale Beach is located in central Broward County and has an area of approximately 4.6 square miles, as shown in **Figure 33**. The City had a population of 41,217 residents according to the 2020 Census, which is now estimated at approximately 43,217. Housing is predominately (~79%) multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate of approximately 1 – 1.5% through 2045. The City currently generates an estimated 107,178 tons of waste per year.

Figure 33. The City of Hallandale Beach



Collection and Disposal Contracts

The collection and disposal contracts for the City were not requested as the City is not part of the Authority. Based on review of the municipality's website, the City's Sanitation Division collects residential MSW, Yard Trash, White Goods and curbside recyclables. Commercial MSW, Yard Trash, White Goods and recyclables are collected through private contracts.

Destination of Materials

Based on review of available online information, waste materials collected are assumed to be routed to receiving facilities as follows:

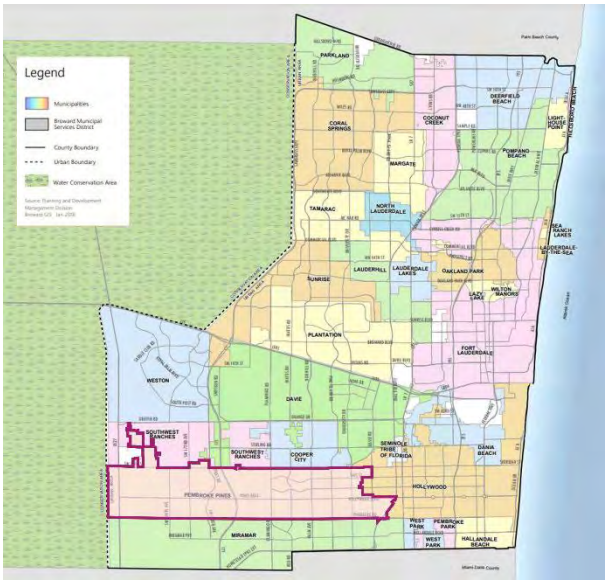
- Residential MSW: Pembroke Park Transfer and Recycling
- Source Separated Recyclables: Pembroke Park Transfer and Recycling
- Commercial MSW: Pembroke Park Transfer and Recycling
- C&D and White Goods: WM Recycling Oakes Road (Sun 14)

2.2.5.1 Pembroke Pines

Municipality Characteristics

The City of Pembroke Pines is located in Southwest Broward County and has an area of approximately 34.7 square miles, as shown in **Figure 34**. The City had a population of 171,178 residents according to the 2020 Census, which is now estimated at approximately 173,231. Housing is almost equally split between single-family homes and multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to initially increase at an annual rate of approximately 0.1% then decrease at 0.1% through 2045. The City currently generates an estimated 429,612 tons of waste per year.

Figure 34. The City of Pembroke Pines



Collection and Disposal Contracts

The collection and disposal contracts for the City were not requested as the City is not part of the Authority. Based on review of the municipality's website, the City has a private contract with Waste

Pro for collection of residential and commercial MSW, Yard Trash, and White Goods. The City suspended collection of recyclable materials in 2022.

Destination of Materials

Based on review of available online information, waste materials collected are assumed to be routed to receiving facilities as follows:

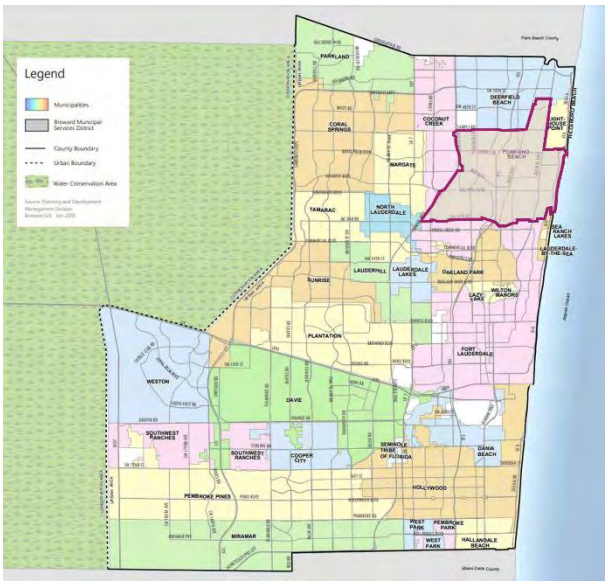
- Residential MSW: South Broward RRF
- Source Separated Recyclables: N/A
- Commercial MSW: South Broward RRF
- C&D and White Goods: South Broward RRF

2.2.5.2 City of Pompano Beach

Municipality Characteristics

The City of Pompano Beach is located in Southeast Broward County and has an area of approximately 25.4 square miles, as shown in **Figure 35**. The City had a population of 112,046 residents according to the 2020 Census, which is now estimated at approximately 120,274. The majority of housing units (58%) are multifamily dwellings (i.e., condominiums, townhouses, etc.). Current projections indicate the City's population is expected to increase at an annual rate of approximately 0.5 – 1.7% through 2045. The City currently generates an estimated 298,281 tons of waste per year.

Figure 35. The City of Pompano Beach



Collection and Disposal Contracts

The collection and disposal contracts for the City were not requested as the City is not part of the Authority. Based on review of the municipality's website, the City's Environmental Services Department collects residential MSW, Yard Trash, White Goods, and curbside recyclables. Commercial MSW is collected through a private contract with Coastal Waste & Recycling.

Destination of Materials

Based on review of available online information, waste materials collected are assumed to be routed to receiving facilities as follows:

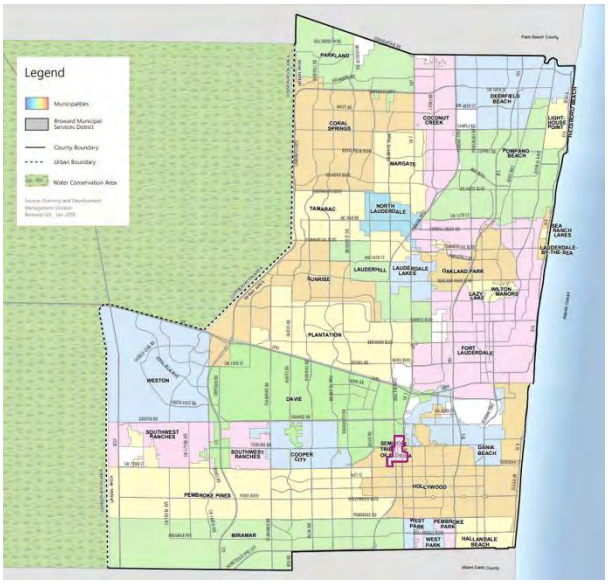
- Residential MSW: Monarch Hill Landfill
- Source Separated Recyclables: WM Recycling – Deerfield or Davie facility.
- Commercial MSW: Monarch Hill Landfill
- C&D and White Goods: Monarch Hill Landfill

2.2.5.3 Hollywood Seminole Indian Reservation

Municipality Characteristics

The Hollywood Seminole Indian Reservation is located in central Broward County and has an area of approximately 0.78 square miles, as shown in **Figure 36**. The reservation had a population of 1,426 residents according to the 2020 Census, which is now estimated at approximately 1,553. Housing is almost entirely single-family homes (100%). Current projections indicate the reservation's population is expected to decrease at an annual rate of approximately 0.1 – 0.2% through 2045. The reservation currently generates an estimated 3,850 tons of waste per year.

Figure 36. Hollywood Seminole Indian Reservation



Collection and Disposal Contracts

The collection and disposal contracts for the Hollywood Seminole Indian Reservation were not requested as the reservation is not part of the Authority.

Destination of Materials

Based on review of available online information, waste materials collected are assumed to be routed to receiving facilities as follows:

- Residential MSW: South Broward RRF
- Source Separated Recyclables: WM Davie Transfer Station
- C&D and White Goods: WM Oakes Road

3.0 EXISTING FACILITIES

There are several types of solid waste disposal, processing, and recycling facilities throughout the County, including vendors that specialize in acceptance of used oil, waste tires, scrap metal, etc. This section presents brief descriptions of permitted facilities that process and/or dispose of significant quantities of solid waste or recyclable materials and affect the management of waste generated within Broward County. Smaller facilities that have limited capacities and represent a de minimus impact on the overall flow of solid waste in the County, or that are not permitted, have been omitted. A list of these facilities, including those considered de minimus for this study, is included in **Appendix C**. Some facilities outside the County, such as the WM Medley and Okeechobee Landfills, are also presented, as they accept significant amounts of waste from Broward municipalities and must be accounted for. The following figures illustrate the location of these facilities within the County by type.

Figure 37. Location of Existing Permitted Solid Waste Facilities throughout the County

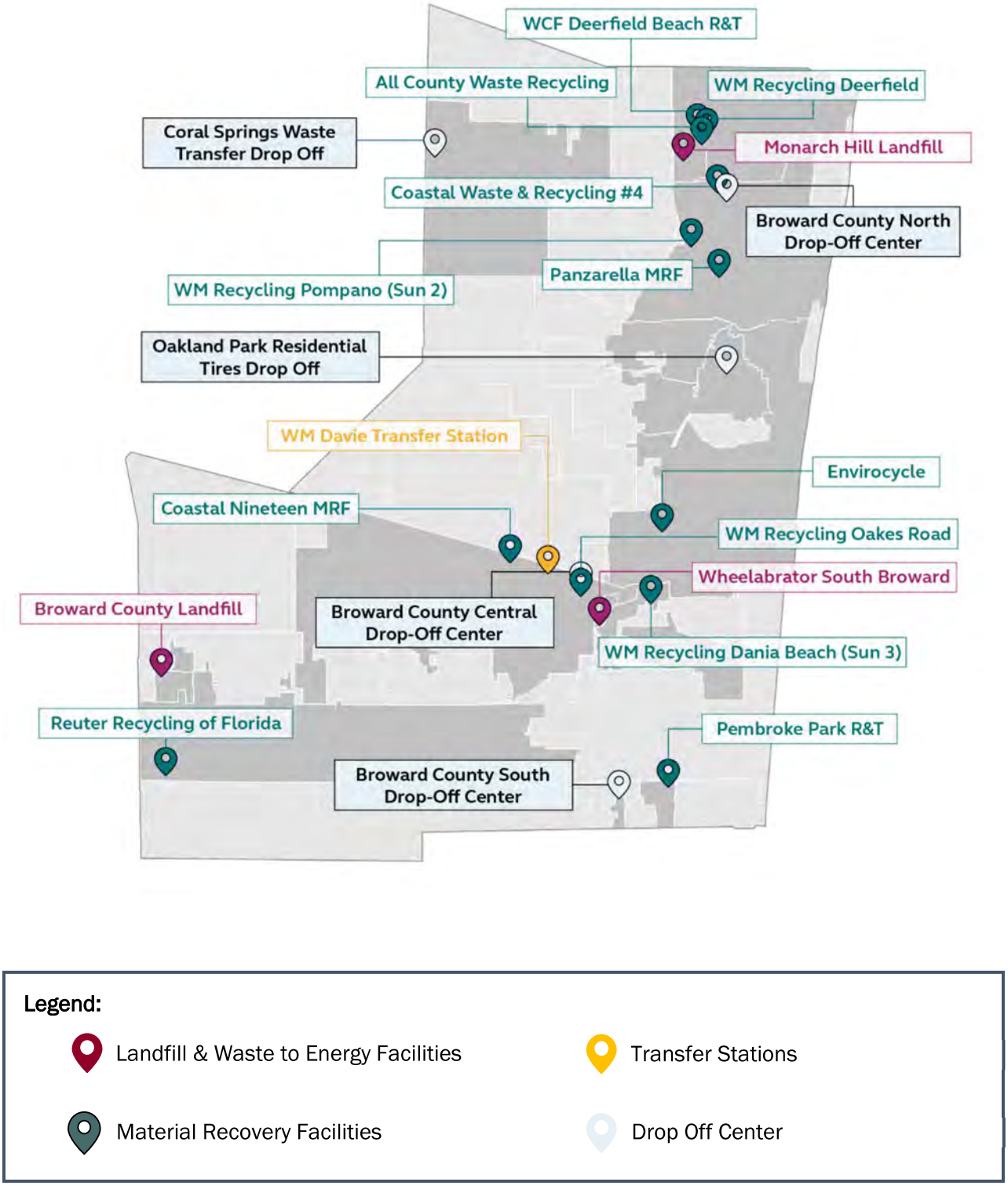


Figure 38. Location of Existing Permitted Landfills & Waste to Energy Facilities

Figure 39. Location of Existing Permitted Material Recovery Facilities

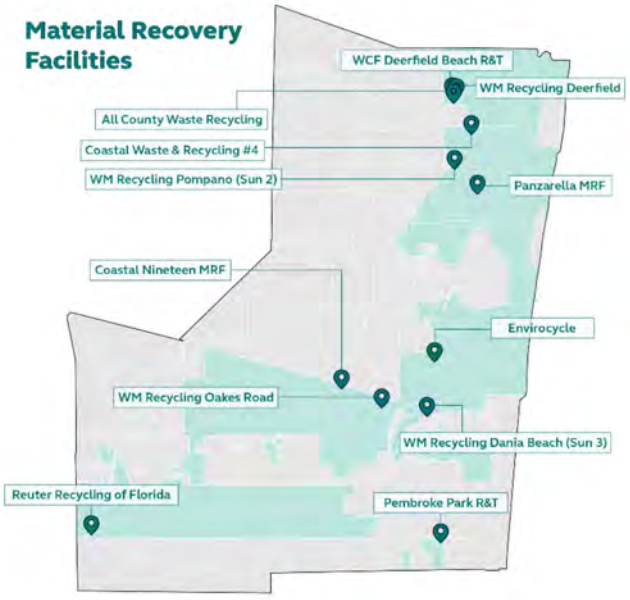


Figure 40. Location of Existing Permitted Drop Off Centers

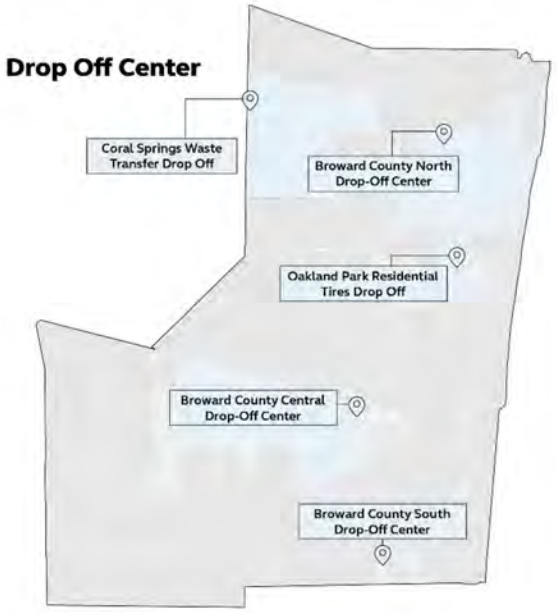
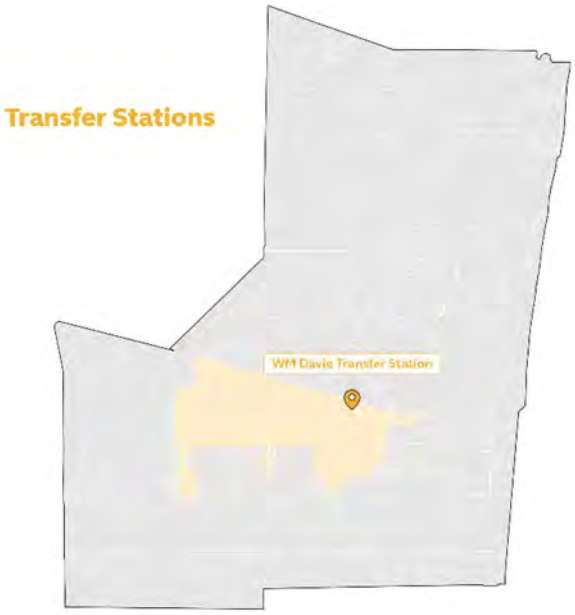


Figure 41. Location of Existing Permitted Transfer Station



3.1 LANDFILLS

Waste generated in Broward County is currently disposed at four landfill facilities, two of which are located in Broward County. Details on each facility, which were determined based on review of solid waste permits and available reports are discussed below.

3.1.1 Monarch Hill Landfill

The Monarch Hill Landfill is a Class I landfill and is owned and operated by WM Inc. of Florida at 2700 Wiles Rd, Pompano Beach, FL 33073. It is approximately 553.7 acres in size and is located in Section 16, Township 48S and Range 42E of Broward County, Florida with three (3) main landfill areas known as CDSL1, CDSL2 and CDSL3. The Monarch Hill Landfill is rapidly approaching permitted capacity as air space is used and is expected to reach airspace capacity in approximately 5 to 7 years according to a March 19, 2024 report by SCS Engineers. WM has proposed to increase the airspace so that additional capacity is available for use, but the expansion remains pending resolution of ongoing Land Use amendment negotiations between WM and Broward County.

3.1.2 Broward County Landfill

The Broward County Landfill is owned and operated by Broward County at 7101 SW 205th Ave, Southwest Ranches, FL 33332 and is a Class I Sanitary landfill consisting of 52 lined acres. This site is approximately 588 acres in size and has 263 acres designated to be within the waste site boundary. The landfill was constructed with a double liner system. The primary liner is an 80-mil high density polyethylene geomembrane (HDPE) and the secondary liner is a 40-mil HDPE with perimeter and lateral leachate collection and leachate detection systems, a landfill gas collection system, and a surface water management system. The site is permitted for operation only and is not authorized for any liner construction, horizontal or vertical expansions without a permit modification through FDEP. The Broward County Landfill currently operates as a Class III landfill with weekly cover and has remaining airspace of approximately 4 years based on the May 10, 2024 Annual Survey Statement Letter, developed by Keith Engineering. However, a new 10-acre cell is currently being planned to provide additional air space.

3.1.3 Medley Landfill

The Medley Landfill is located at 9350 NW 89th Avenue, Medley, Florida 33178 and is owned and operated by WM. The site lies approximately one mile east of the Florida's Turnpike and one-half of a mile south of Highway 27 (Okeechobee Road) as shown in **Figure 42**.

The Medley Landfill is a 177.4-acre Class I landfill that includes multiple active disposal areas and five closed areas. A vertical expansion of the landfill was approved in August 2020 increasing the maximum peak elevation from 240 feet National Geodetic Vertical Datum (NGVD) to 340 feet NGVD. The facility is authorized to receive Class I and Class III wastes, Yard Trash and C&D waste and receives approximately 1.3 million tons of waste per year. Yard trash is processed on site and used as a component in initial and intermediate cover material.

The remaining life of the Medley Landfill, including the vertical expansion, is approximately 14.3 years, based on the permitted waste disposal rate of 800,000 tons/year. However, WM is in the process of acquiring approximately 100 acres of land adjacent to the landfill and has filed an application with FDEP for a horizontal expansion of the facility.

Figure 42. WM Medley Landfill

3.1.4 Okeechobee Landfill

The Berman Road Landfill, also known as the Okeechobee Landfill, is a Class I landfill located at 10800 NE 128th Avenue, Okeechobee, Florida 34972 as shown in **Figure 43**. The Okeechobee Landfill is authorized to receive Class I and Class III wastes, Yard Trash and C&D waste and receives approximately 5,700 tons of waste per day. The peak elevation of the landfill will be at 370 ft NGVD. According to the WM fact sheet for the facility, the landfill has a total area of 4,100 acres, with a permitted footprint of 969 acres and remaining life is estimated at 150 years. A Florida East Coast Railway intermodal facility is located in Fort Pierce, approximately 31 miles from the landfill, allowing for rail haul access from distant communities.

The Okeechobee Landfill also has a 7.5-acre Organics Processing Facility that processes approximately 50,000 tons of mixed material per year.

Figure 43. WM Okeechobee Landfill

3.2 WASTE-TO-ENERGY FACILITY

The South Broward Waste-to-Energy (WTE) Facility, also known as the South Broward RRF Facility, is located at 4400 South State Road 7, Fort Lauderdale, FL 33314. The facility is currently owned and operated by WIN Waste Solutions, Inc. The facility is a mass burn WTE that was constructed in 1991 and consists of three municipal solid waste combustors (MWC) with auxiliary burners, lime storage and processing facilities, ash storage and processing facilities, a cooling tower and ancillary support equipment. The facility operates 24 hours a day, every day of the year and only accepts processible residential, commercial, and nonhazardous waste. The facility's MWC's each have a nominal design capacity of 750 tons per day, and total throughput capacity is limited to a maximum of 2,589 tons per day. The nominal (i.e., generator nameplate) electric generating capacity of the facility is 66.1 megawatts (MW), which is sold to the local utility company.

Ash resulting from WTE operations is disposed in an onsite Class I ash monofill owned by Broward County.

3.3 MATERIAL RECOVERY FACILITIES

There are currently 12 active Material Recovery Facilities (MRF) located throughout the County. Details associated with each facility were determined through review of their solid waste permits and available reports and are summarized below.

3.3.1 Reuter Recycling of FL

The Reuter Recycling of FL MRF, located at 20701 Pembroke Rd, Pembroke Pines, FL 33029, is owned and operated by WM. The north building is used to operate a waste processing facility/transfer station for the receipt and processing of residential and commercial solid waste, residential White Goods, yard trash and C&D debris. This is a fully enclosed building in which all unloading, waste processing, storage and loading operations occur. The facility receives materials from numerous ILA members in the County and can handle up to 5,660 tons per day of all solid waste materials. WM is expected to commence construction of a 127,000 square foot MRF adjacent to the existing Reuter Recycling facility in the fall of 2024. This facility is anticipated to process between 750 and 825 tons of recyclable material per day and employ optical sorters, AI, and robotics to ideally capture 95% of recyclable material, according to a WM press release.

3.3.2 Pembroke Park R&T

The Pembroke Park Recycling & Transfer (R&T) facility is owned and operated by Waste Connections of Florida at 1899 SW 31st Ave, Pembroke Park, FL 33009. This is a multipurpose waste processing and transfer facility for the receipt of Class I waste where loading and unloading takes place inside the facility building while metal, wood and yard trash are stored outside. The facility is permitted to process/transfer approximately 1,200 tons per day.

3.3.3 WM Recycling Oakes Road

The WM Recycling Oakes Road facility is owned and operated by WM at 3250 SW 50th Ave, Davie, FL 33314. This is a waste processing facility and transfer station for the receipt of C&D, Class III waste, yard trash, clean debris and recovered materials. The facility is permitted to process/transfer approximately 5,100 tons per day.

3.3.4 All County Waste Recycling

The All County Waste Recycling facility is owned and operated by All County Waste Recycling Inc. at 1810 SW 42nd Way, Deerfield Beach, FL 33442. This is a waste processing facility for the receipt of Class I waste, White Goods, C&D, yard trash, clean debris and recovered materials. The facility was recently issued a modification to its solid waste permit that would involve expansion of the current building footprint for the purpose of expanding the types of waste accepted and increasing the waste intake capacity. The new floor plan provides for segregating tipping floors and material processing equipment for recovery of materials from incoming C&D debris. Upon completion of construction, and permit approval, the facility will be permitted to receive approximately 1,700 tons per day of solid waste.

3.3.5 WCF Deerfield Beach R&T

The WCF Deerfield Beach R&T facility is owned and operated by Waste Connections of Florida at 1751 SW 43rd Terrace, Deerfield Beach, FL 33442. This is a waste processing facility for the receipt of C&D debris, vegetative debris, yard trash, Class I waste, Class III waste, clean debris, and recovered materials. Incoming materials are sorted into the following recyclable constituents; paper, cardboard, aluminum, glass, ferrous and non-ferrous metals, plastic, wood, and clean debris using a portable picking line. All operations take place inside the building located on site with the exception of two (2) containers located outside the facility that can be utilized for storage of recyclable materials. The facility is currently permitted to process approximately 1,440 tons per day. Once the

construction of a major modification is completed, and upon permit approval, the facility will be permitted to process approximately 2,440 tons per day.

3.3.6 WM Recycling Deerfield

The WM Recycling Deerfield facility is owned and operated by WM at 1750 SW 43rd Terrace, Deerfield Beach, FL 33442. This is a waste processing facility for the receipt of Class I, Class III, and C&D waste. The facility has a fully enclosed 36,480-sqft building on the western 3.6-acre property for the receipt and processing of Class I waste and an unenclosed canopy building on an east-adjacent 4.9-acre parcel, for the receipt and processing of Class III waste and C&D debris. Class I waste is processed inside the West building, while Class III waste and C&D debris is processed inside the East building. All waste processing, unloading, and loading operations take place inside the designated facility buildings. The facility is permitted to process approximately 4,000 tons per day of Class I waste, with 325 tons per day of recovered materials in the west building and 2,400 tons per day of Class III and C&D in the east building.

3.3.7 Coastal Nineteen MRF

The Coastal Nineteen MRF is owned and operated by Coastal Waste & Recycling of Florida at 7061 SW 22nd Ct, Davie, FL 33317. This is a waste processing facility for the receipt of Class III waste, C&D, clean debris and recovered materials. The materials are sorted into recoverable materials such as: cardboard, paper, metals, plastics, wood, concrete, and glass. The facility is permitted to process approximately 360 tons per day.

3.3.8 Panzarella MRF

The Panzarella MRF is owned and operated by Panzarella MRF LLC at 1601 SW 3rd St, Pompano Beach, FL 33069. This is a waste processing facility for the receipt of C&D, yard trash, clean debris, and recovered materials. The materials are sorted into recyclable constituents and non-processable material. The recyclable materials are paper, cardboard, aluminum, glass, ferrous and non-ferrous metals, plastic, wood, and mulch. A modification was done on the recent license renewal to add processing equipment for sorting and a roof structure to enclose the concrete pad on the northern portion of the site for C&D processing and storage. The modification would also add sorting line and baler equipment within the existing metal building on the southern portion of the site for processing and storage of Class III waste. The facility is permitted to process approximately 192 tons per day.

3.3.9 Coastal Waste & Recycling #4

The Coastal Waste & Recycling #4 facility is owned and operated by Coastal Waste & Recycling of Florida at 1840 NW 33rd St, Pompano Beach, FL 33064. This is a waste processing facility for the receipt of Class III waste materials such as C&D and yard trash. The materials are sorted into recovered materials as follows: cardboard, paper, metals, plastics, and glass. The facility is permitted to process approximately 2,160 tons per day.

3.3.10 Envirocycle

The Envirocycle facility is owned and operated by Envirocycle Inc. at 849 SW 21st Terrace, Fort Lauderdale, FL 33312. This is a waste processing facility for the receipt of C&D and recovered materials. The materials are sorted into recyclable constituents including cardboard, ferrous and non-ferrous metals, wood, glass, and plastic. All operations take place inside the two buildings located on-site. The facility is permitted to process approximately 1,200 tons per day.

3.3.11 WM Recycling Pompano (Sun 2)

The WM Recycling Pompano (Sun 2) facility is owned and operated by WM at 2281 NW 16th St, Pompano Beach, FL 33069. This is a waste processing facility utilizing a concrete pad, covered building, and a Terex prefabricated picking line for the receipt and processing of C&D debris, yard trash, Class III waste, White Goods, clean debris, and recovered materials. The materials are sorted into recyclable constituents, recovered screen material (RSM), and non-processable material. Class III waste is received, processed, and stored in a separate area inside the building. Non-recyclable solid waste separated from the incoming C&D and Class III waste streams are stored inside the building. The facility has a designated area for HHW collection events and single stream recovered materials. The facility is permitted to process approximately 2,400 tons per day.

3.3.12 WM Recycling Dania Beach (Sun 3)

The WM Recycling Dania Beach (Sun 3) facility is owned and operated by WM at 3251 SW 26th Terrace, Fort Lauderdale, FL 33312. This is a waste processing facility utilizing a concrete pad, covered building, and a Terex prefabricated picking line for the receipt and processing of C&D debris, yard trash, Class III waste, White Goods, clean debris, and recovered materials. The materials are sorted into recyclable constituents, RSM, and non-processable material. All operations take place inside the building located on site. The available permit information does not indicate what capacity the facility is permitted to process.

3.4 TRANSFER STATIONS

There is one standalone major transfer station in Broward County, although it should be noted that some of the major waste and recycling facilities previously discussed in the County also have transfer stations co-located onsite, such as in Reuter Recycling and WM Oakes Road, among others.

3.4.1 WM Davie Transfer Station

The WM Davie Transfer Station is owned and operated by WM at 2380 College Ave, Davie, FL 33317. This is a transfer station for Class I MSW and single stream source separated recyclables. The transfer station can receive and transfer up to 2,000 tons per day consisting of approximately 1,000 tons per day of Class I waste and 1,000 tons per day of single-stream recyclable material which are managed on a first-in/first-out basis.

Waste received at the facility from Broward County is loaded into 40-foot intermodal containers and trucked to the Florida East Coast Railway (FEC) Fort Lauderdale Rail Terminal. The intermodal containers are then lifted onto the rail cars and transported by rail 131 miles to FEC's Fort Pierce terminal where they are unloaded for a 31-mile trip by truck to the Okeechobee Landfill for disposal.

There are additional transfer stations that handle yard trash listed in the FDEP database that are exempt from registration and permitting but are included in Appendix C for information.

3.5 LOCAL VENDORS

In addition to the major facilities identified above, there are also smaller operations run by local vendors for specific types of waste. This section briefly discusses these local vendor facilities for informational purposes, note that these facilities have limited capacities and represent a de minimus impact on the overall flow of solid waste in Broward County.

3.5.1 Waste Tire Collection and Processing Facilities

According to the FDEP database, there are approximately 20 registered local vendors that collect waste tires, as well as six registered waste tire collection centers, and one registered tire processing facility that is not co-located within a major solid waste facility.

Tires are commonly collected at car dealerships, oil change and tire repair shops, and general auto mechanic businesses that typically accept waste tires for a fee from customers engaged in business there. Some municipalities, such as the City of Oakland Park, maintain a drop off location for residents to drop off waste tires. Broward County maintains three drop off centers where residents of the BMSD and certain municipalities can drop off a maximum of five tires per visit.

3.5.2 Used Oil

According to the FDEP database, there are approximately four local facilities that perform used oil recycling in Broward County. Some local chain retailers such as Auto Zone and Advanced Auto Parts accept used oil from the general public, as well as automotive businesses such as car dealerships, and auto mechanics that perform oil change services.

Some municipalities have agreements with collections contractors or facilities such as South Broward RRF for drop off events for HHW, including used oil. Used oil is included in the County's HHW drop off program via ILA agreements for residents of the below municipalities:

- Broward Municipal Services District
- Dania Beach
- Davie
- Hollywood
- Lauderhill
- Lazy Lake
- Lighthouse Point
- Margate
- North Lauderdale
- Oakland Park
- Parkland
- Pembroke Park
- Sea Ranch Lakes
- Weston
- West Park

3.5.3 Hazardous Household Waste (HHW)

The FDEP database does not specifically identify a class of facilities as HHW receiving and processing facilities in Broward County, however some facilities such as the South Broward RRF or some MRFs can receive HHW. An example would be Cooper City or Plantation who both have an agreement with South Broward RRF for residents to be able to drop off HHW, which may include used oil or E-waste. Some municipalities have agreements for collection contractors to host HHW drop-off days on certain time intervals, such as Southwest Ranches who contracts with WM to have quarterly drop off events at the local Rolling Oaks Barn Park. Residents from municipalities[3] that

[3] https://www.broward.org/WASTEANDRECYCLING/RECYCLING/Pages/CityContacts.aspx

have an HHW ILA agreement with the County noted below can drop off HHW at one of Broward's three drop off locations.

- Broward Municipal Services District
- Dania Beach
- Davie
- Hollywood
- Lauderhill
- Lazy Lake
- Lighthouse Point
- Margate
- North Lauderdale
- Oakland Park
- Parkland
- Pembroke Park
- Sea Ranch Lakes
- Weston
- West Park

The Southeast Florida Purchasing Co-Operative Group is comprised of government entities from throughout the region of South Florida within Miami-Dade, Broward and Palm Beach counties to provide cost savings and cost avoidances to member entities.

3.5.4 Organic Waste

According to the FDEP database, there are approximately six registered separated organics processing facilities that accept organic waste and/or yard trash. These local operations work to divert yard trash and other organics from landfills. There are also several local vendors who run local operations to divert organic waste.

A local vendor called Renuable[4] operates in the County, offering participants buckets to place post-consumer food waste and yard trash that is collected on a weekly or bi-weekly basis for composting. Participants can also choose to drop off their collected organic material at one of several local businesses that partners with Renuable. The vendor reports on its website having diverted nearly 885 tons since 2020, but it also operates in Miami-Dade and the Tampa & St Petersburg areas, therefore, the actual tonnages collected for Broward County are unknown.

DFB Compost and Filthy Organics collaborated in a recent partnership with the City of Deerfield Beach[5] in a pilot for residential post-consumer food waste collection at 100 residences and five local businesses. Residents not participating in the program can contact Filthy Organics to coordinate dropping off food waste. The local operation has accepted nearly 20 tons of post-consumer food waste in 2023, which was processed into compost for program participant use.

The City of Plantation has a Horticultural Recycling Center[6] at its recycling drop-off center located at 750 NW 91st Ave, Plantation, FL 33324, which accepts natural foliage, (i.e., tree branches, palm

[4] https://liverenuable.com/
[5] https://deerfield-beach.com/1871/Composting
[6] https://www.plantation.org/government/departments/public-works/landscape-yard-waste/horticultural-recycling-center

fronds, bushes, and grass clippings) from City residents for processing into mulch. The City offers this mulch free of charge to residents for use.

Anaerobic Digesters

Anaerobic Digestion is a type of organic waste processing method used in the processing of sewage sludge at water resource recovery facilities which is considered liquid waste digestion. Also commonly used to process manure at large livestock facilities, and in the processing of food waste.

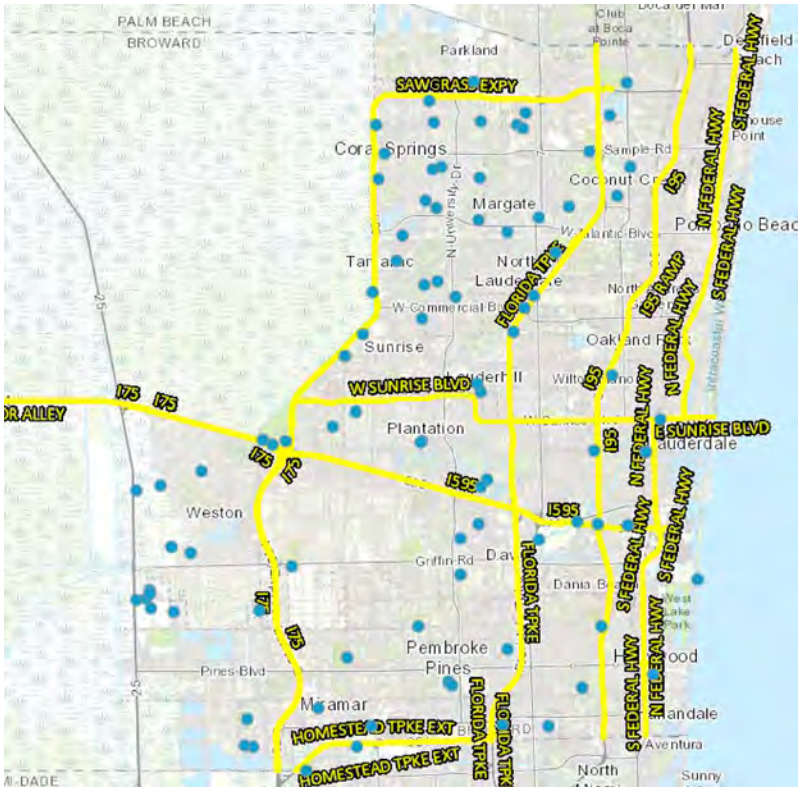
Broward County Water and Wastewater division partnered with ENGIE Services[7] to implement a cogeneration system for the anaerobic digestion process at the North District Wastewater Treatment Plant to enhance its capacity to deal with sludge and increase diversion. The resulting biogas, which includes methane from the anaerobic digestion process, is collected and used by the plant to offset an estimated up to 1.99 megawatts of electricity that would otherwise be purchased from the local electrical utility. The system can receive fats, oils, and grease (FOG) from urban waste.

3.5.5 Disaster Debris

According to the County's GIS map[8] (**Figure 44**), there are 90 Disaster Debris management sites that are Pre-Authorized throughout Broward County. These are temporary operating yards that are used to hold and manage emergency debris, such as those that occur from hurricanes which pose the potential to produce a significant amount of waste which can impact solid waste operations.

[7] https://engieservices.us/success-stories/success-story-broward-county-water-and-wastewater-division/
[8] https://bcgis.maps.arcgis.com/apps/dashboards/7af5e709247949cc9c5698487ec74fe6

Figure 44. GIS Map of Disaster Debris Management Sites by Broward County



3.5.6 E-Waste

There are no specific E-Waste handling facilities registered in the FDEP system within Broward County, as Florida has no specific laws or regulations that apply to discarded electronic products[9]. However, the FDEP provides guidelines, and the EPA also encourages electronics recyclers to become accredited in the Responsible Recycling[10] (R2) and E-Stewards[11] programs to adopt best practices for data privacy, and handling of the materials that benefits the environment.

A few local vendors that have been identified to operate in Broward County and claim to be certified in the collection and recycling of E-waste are:

- Elian Electronics Recycling[12]
- The Friendly Earth[13]

[9] https://floridadep.gov/waste/permitting-compliance-assistance/content/electronics-waste
[10] https://sustainableelectronics.org/
[11] https://e-stewards.org/
[12] https://www.elianelectronicsrecycling.com/
[13] https://thefriendlyearth.com/

Additionally, residents of the following municipalities can drop off E-waste products for recycling at three drop off locations in Broward County:

- Broward Municipal Services District
- Dania Beach
- Davie
- Hollywood
- Lauderhill
- Lazy Lake
- Lighthouse Point
- Margate
- North Lauderdale
- Oakland Park
- Parkland
- Pembroke Park
- Sea Ranch Lakes
- Weston
- West Park

4.0 AUTHORITY MASS BALANCE

An Authority-wide mass balance model was developed to estimate the generation rates, composition, and routing of solid waste and source-separated recyclables from ILA member municipalities to diversion and disposal facilities. The following sections describe the methodology utilized to develop the solid waste mass balance model.

4.1 METHODOLOGY

The Authority solid waste mass balance model estimates the mass (tonnage) of solid waste and recycling materials that exist within the County during a specific time. The model calculates the tonnage of waste routing within the County through four distinct phases, including Generation, Collection, Transfer/Routing, and Diversion/Disposal for each year from 2020 to 2070. In each phase, the total tons and the tonnage of each material type in the waste stream for each of the ILA member municipalities is calculated. The total tons are then calculated across the four phases, and when they are equal, the County's solid waste system is balanced, and all waste is accounted for.

The generation of waste is based on the estimated population and the distribution of housing and commercial businesses in a given municipality, which will be explained in further detail below. Waste composition is based on the results in the Broward County 2023 Waste Characterization Study Final Report[14]. Routing of waste is based on collections contracts and data provided by the Authority. A review of the mass balance model inputs, calculations, and assumptions through the four model phases is presented in the sections below.

4.2 WASTE GENERATION

The generation of solid waste in a given community is determined primarily by its population. Therefore, accurate population and growth rate estimates are needed for each ILA member

[14] https://browardleague.org/wp-content/uploads/2024/06/Broward-County-Waste-Composition-Study-Final-Report-0524.pdf

community to estimate the tonnage and composition of solid waste that they currently generate and project the tonnages they will generate in future years.

4.2.1 Population

The population calculations for each municipality in the mass balance model begins in 2020, as that was the most recent US Census year, and is referred to as the "Calibration Year". All population projections and growth rates after 2020 are based on the 2023 Broward County and Municipal Population Forecast and Allocation Model (PFAM)[15], published by the Broward County Planning and Development Management Division. Growth rates were adjusted manually for each ILA member for each year of the model from 2020 to 2045 to match (as closely as possible) the population values published in the 2023 PFAM. Some municipalities show a decrease in population, which appears unlikely.

4.2.2 Waste Generation

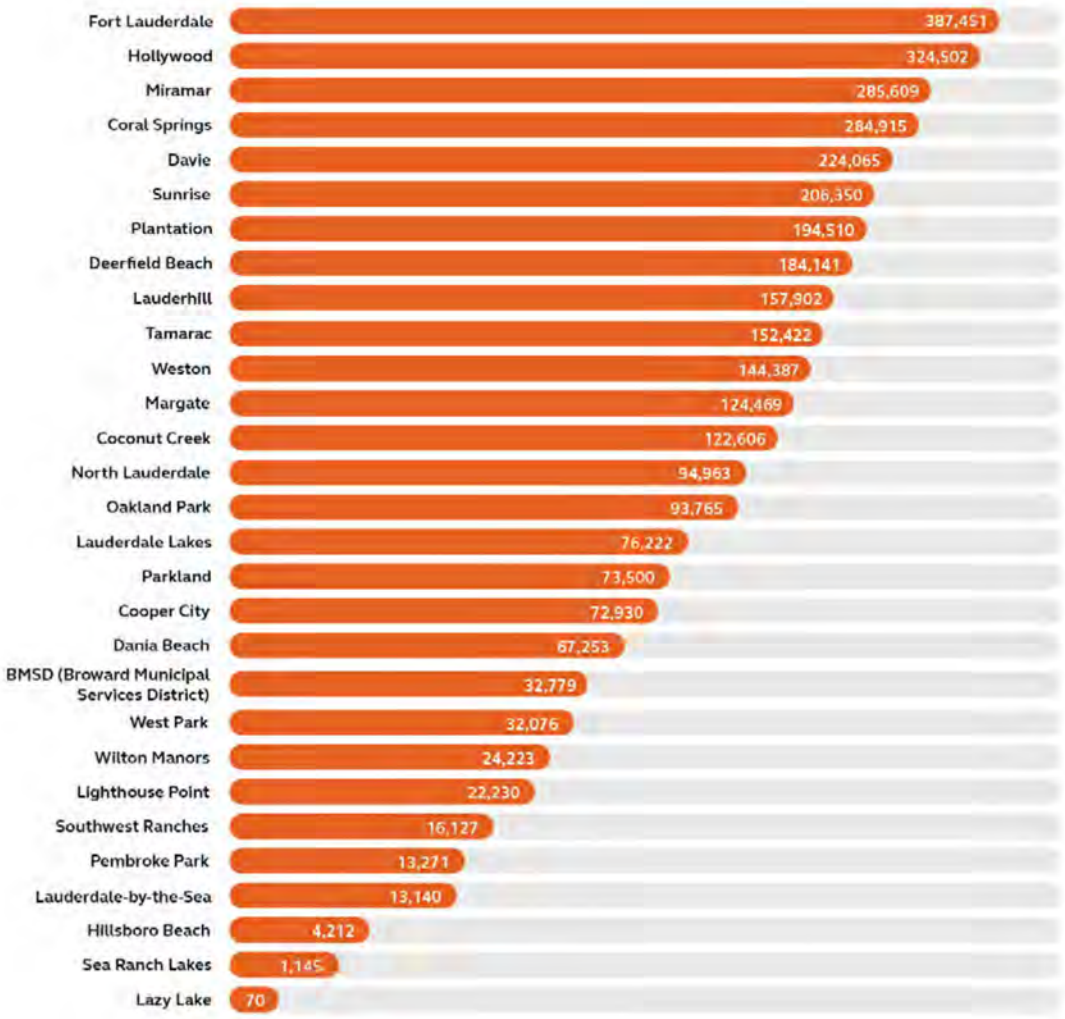
The estimate of waste generation is based on County data provided in the FDEP reports titled *2020 MSW Collected and Recycled by Generator Type By Descending Population*[16] and *2020 Total Tons of MSW Materials Collected and Recycled In Florida By Descending Population*[17]. This data includes total population (as reported by the US Census Bureau) and the total tons of single-family, multi-family, and commercial MSW collected. Waste generation is closely correlated with population, and the waste generation rate for a given municipality is commonly reported in tons per capita, per year. The calculated per capita generation rate is used to estimate the total waste generated per year. The generation rate is projected using a trendline of the past five years of per capita growth, with three options: 1) Low, which is the trendline rate less 0.75%, 2) Medium, which is a continuation of the trendline rate, and 3) High, which is the trendline rate +0.75%. The Medium per capita growth rate was used for the initial mass balance model calculations. **Figure 45** provides a summary of the estimated 2020 waste generation by ILA member.

[15] https://www.broward.org/Planning/Demographics/Documents/2017PFAMReportA.pdf

[16] https://floridadep.gov/sites/default/files/2020%20Total%20Tons%20MSW%20Collected%20%26%20Recycled_By_Gen_2.pdf

[17] https://floridadep.gov/sites/default/files/2020%20Total%20Tons%20Collected%20and%20Recycled_Other_Paper_Food_Misc.pdf

Figure 45. Broward County Waste Generation by Municipality, tpy, 2020



The waste generation rate is different for single-family residents, multi-family residents, and commercial employees and customers, so a further refinement of the population estimates for those waste fractions is needed. For this purpose, the ILA member data in the model includes an estimate of single family and multifamily housing units in 2020, which were taken from the Broward County Affordable Housing Needs Assessment[18]. From this data, both the number of single- and multi-family housing units and the average number of residents per unit can be estimated, which allows an estimate of the population of single-family and multi-family residents. Combining these refined population estimates with the FDEP MSW tonnage data, the per capita waste generation rate ratio for each housing unit type was calculated for 2020, which is the portion of the county-wide per-capita generation rate represented by residents of each housing type. This ratio is then multiplied by the total per capita generation rate to get the direct waste generation rate, which is recalculated as the model year (and county-wide waste generate rate) changes. The commercial waste generation rate ratio is similarly calculated from the commercial tons reported in the FDEP report titled *2020*

[18] https://www.broward.org/BrowardHousingCouncil/Documents/NeedsAssessment/2022NeedsAssessment.pdf

MSW Collected and Recycled By Generator Type[19] less the C&D tonnage reported in the FDEP report titled *2020 Total Tons of MSW Materials Collected and Recycled In Florida*[20], divided by the 2020 population estimate for Broward County from the US Census Bureau. This ratio is then multiplied by the total per capita generation rate to get the direct waste generation rate, which is recalculated as the model year (and county-wide waste generate rate) changes. Calculation of the generation rate for C&D/BW materials is not necessary, as the total tonnage generated by that waste fraction is the remaining tonnage after the tonnage from all the other waste fractions are calculated, as described in the following section.

4.2.3 Waste Composition

To estimate the waste composition for each ILA member, the model uses the four waste fractions presented in the Broward County 2023 Waste Characterization Study Final Report[21], which are defined as follows:

1. Source-Separated Recyclables (SSR) – this type includes clean recyclables collected from curbside residential collection and multi-family and commercial recycling containers.

2. Residential MSW (RMSW) – includes MSW from single-family residences.

3. Commercial MSW (CMSW) – includes MSW from multifamily and commercial properties.

4. Construction and Demolition Waste and White Goods (C&D/BW) – includes wastes from the construction and demolition of structures (i.e., roofing shingles, wood, concrete, drywall, etc.), as well as White Goods such as furniture, mattresses, and others.

During the waste characterization study (performed as part of a separate engagement with Broward County), SCS conducted sampling and determined the materials composition of each of these four waste fractions. The percentages of each waste fraction were then calculated for each ILA member municipality, as follows:

- **SSR** - The SSR percentage depends on access to and participation in recycling. Access is determined by the availability of residential curbside recycling service and requirements for commercial recycling (which includes multi-family residential housing), and participation is estimated using an assumed setout rate for single-family residential, multi-family residential, and commercial properties. From this data, the recycling tons for single-family residential, multi-family residential, and commercial properties are calculated, then divided by the total tons for the ILA member municipality to result in the waste fraction percentage.

- **RMSW** – The RMSW percentage is calculated by multiplying the total single-family population by the single-family generation rate to get the residential MSW tons

[19] https://floridadep.gov/sites/default/files/2020%20Total%20Tons%20MSW%20Collected%20%26%20Recycled_By_Gen_2.pdf

[20] https://floridadep.gov/sites/default/files/2020%20Total%20Tons%20Collected%20and%20Recycled_Other_Paper_Food_Misc.pdf

[21] https://browardleague.org/wp-content/uploads/2024/06/Broward-County-Waste-Composition-Study-Final-Report-0524.pdf

generated, deducting the recycling (SSR) tonnage, and then divided by the total tons for the ILA member municipality to result in the waste fraction percentage.

- **CMSW** – The CMSW percentage is calculated by adding the multi-family MSW tons generated (product of the total multi-family population and the multi-family generation rate) and the commercial MSW tons generated (product of the total population and the commercial generation rate), then deducting the calculated recycling (SSR) tonnage for multi-family and commercial. The result is then divided by the total tons for the ILA member municipality to get the waste fraction percentage.

- **C&D/BW** – The C&D/BW percentage is simply the remaining waste fraction, calculated as 100% minus the sum of the three waste fractions calculated above.

The total tons calculated for each ILA member municipality are then multiplied by the calculated waste fractions above, resulting in the total tonnage for each waste fraction. Those tons are then multiplied by the material composition percentages to get the total tons of each material type in each waste fraction. **Figures 46 and 47** presents the annual tons of waste materials collected by material type in a bar chart and a pie chart respectively (2020).

Figure 46. 2020 Annual Tons of Waste Materials Collected by Material Type Bar Chart

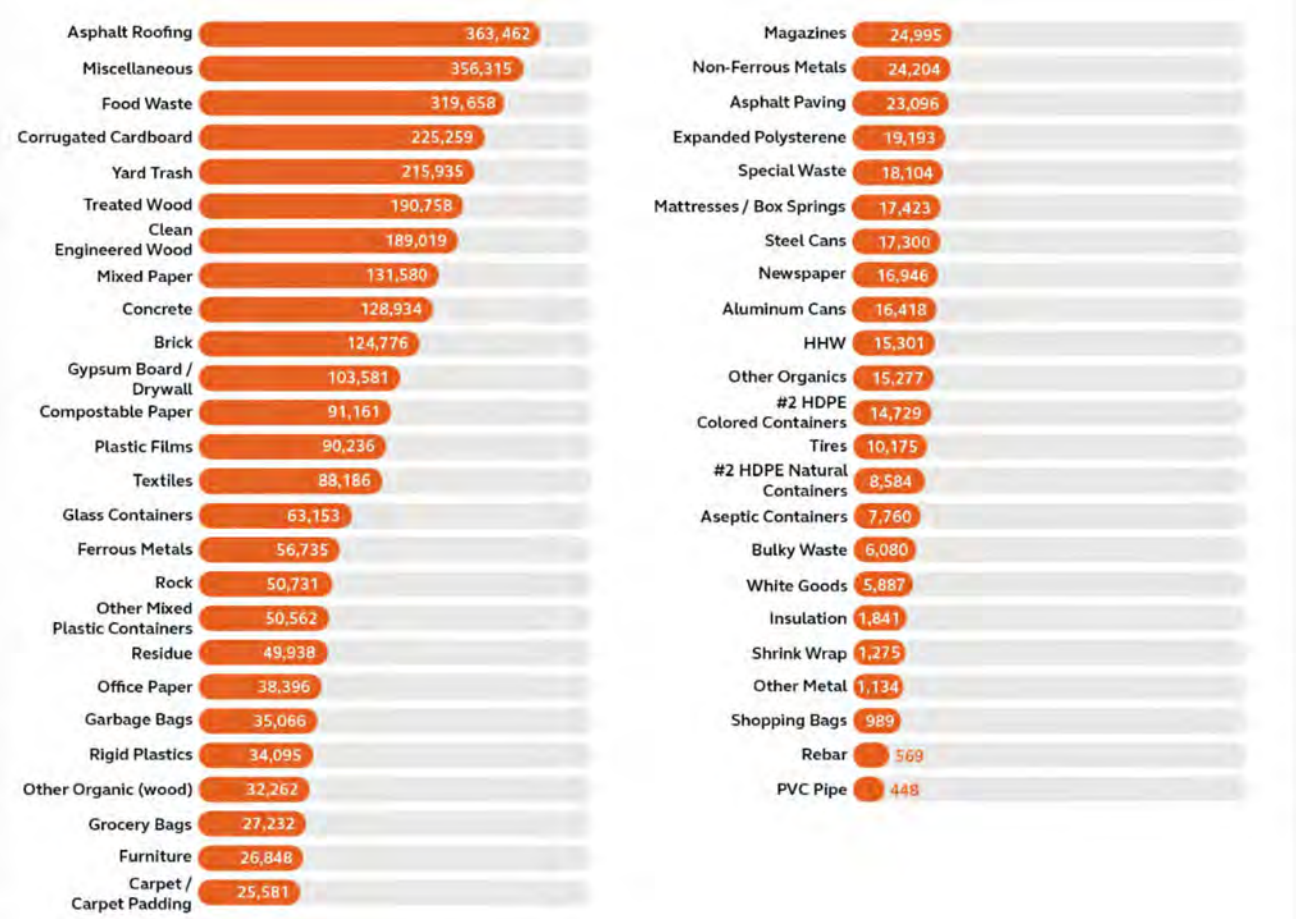
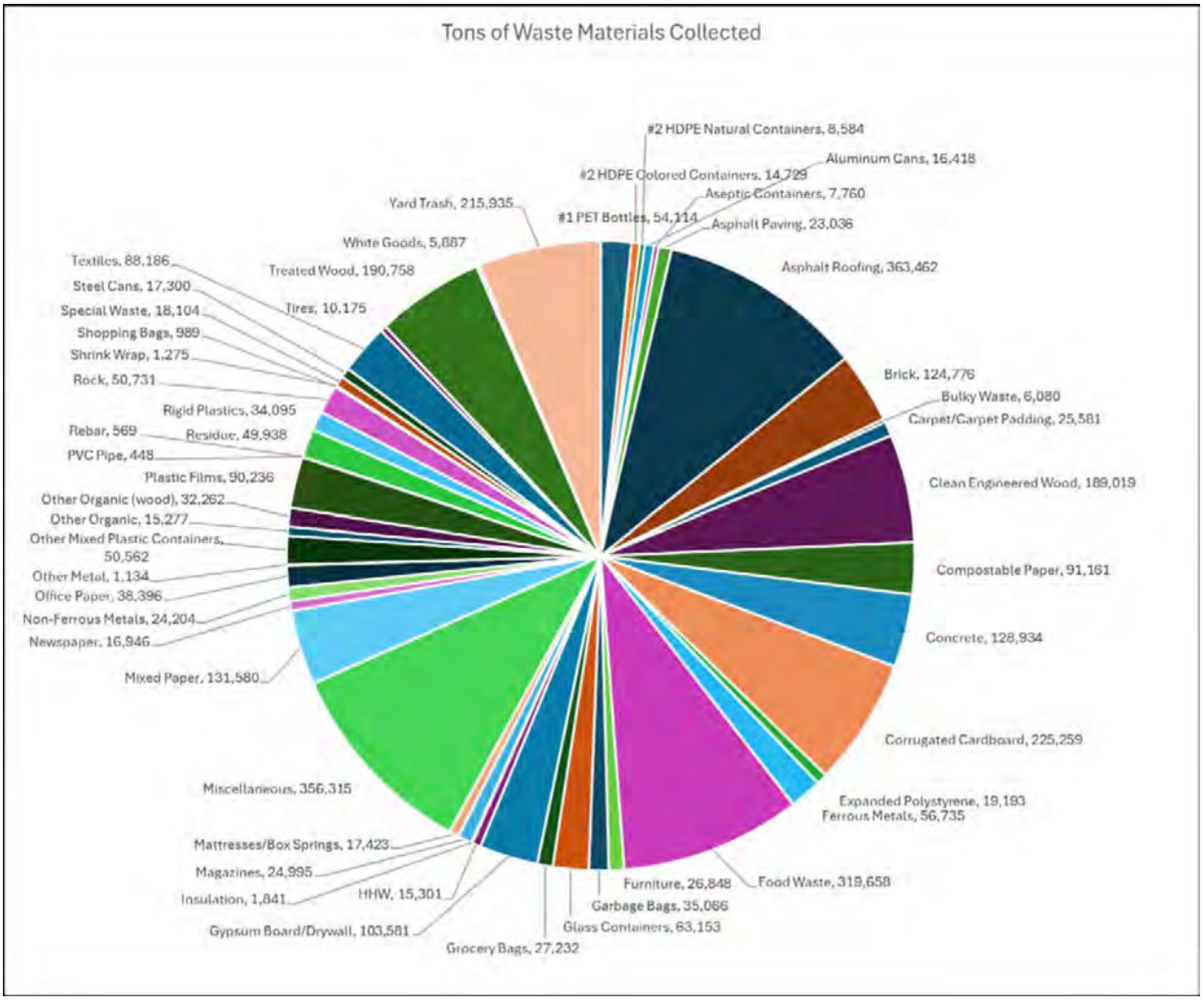


Figure 47. 2020 Annual Tons of Waste Materials Collected by Material Type Pie Chart



4.3 WASTE COLLECTION

Waste collection contracts provided by the Authority were reviewed to determine if residential curbside recycling was available and which disposal facility(ies) the collected waste was routed. The collected waste tonnage, separated by material type, was then routed to either a transfer station or a diversion/disposal facility, as explained in the next section.

4.4 WASTE TRANSFER/ROUTING

The mass balance model calculates the waste tonnage collected for each material type from each of the ILA member communities. Collected waste must then be routed to either a transfer or processing facility (i.e., transfer station, MRF, etc.) or, for some materials, directly to a diversion/disposal facility (i.e., waste tire collector, landfill, WTE, recycling secondary markets, etc.). The user selects the routing facility by pulldown menu, which is pre-populated with the solid waste facilities known to be operating in Broward County.

4.5 WASTE DIVERSION/DISPOSAL

The Diversion/Disposal area of the mass balance model shows the transfer, processing, and receiving facilities that are available (or may be available) for Authority waste. Once the Transfer/Routing facility selections are made, the tonnage routed to each facility is calculated and compared to its permitted capacity. Once a facility reaches 80% capacity a yellow highlight warning appears, which changes to red when it reaches 90% capacity. In this manner, the model can indicate to the user when facilities begin to experience capacity issues and the timeline for when new facilities are needed to be operational can be predicted. Waste received at transfer and processing facilities must then be further routed, by material type, to a receiving facility such as a landfill, recycling market, or other end user and is the end of the waste material flow. The user selects the receiving facility by pulldown menu, which is pre-populated with the receiving facilities available to Broward County. Additional analyses can then be made, if necessary, to estimate the remaining life of the receiving facilities.

4.6 AUTHORITY MASS BALANCE MODELING NEXT STEPS AND USES

As part of the activities conducted in Task 4 – Future Needs Assessment, and as additional contracts or disposal information are obtained, the Authority mass balance model will be further refined and routing of solid waste to specific facilities will be revised and finalized. The Authority mass balance model will then be utilized to develop up to five solid waste management scenarios providing for the future solid waste and recovered materials processing capacity and needs of the Authority, which will be described in the Task 4 – Future Needs Assessment white paper.

5.0 POTENTIAL IMPEDIMENTS

There are several factors that could be potential impediments to the Authority addressing solid waste and recycling efforts, such as existing solid waste facility type and technology, capacity and limitations in processing throughput, funding needed to provide for both the development of new facilities as well as operations and maintenance (O&M) costs, availability of suitable land for development of new facilities, commercial recycling flow control, and transportation logistics, which are described in more detail below.

5.1 EXISTING SOLID WASTE INFRASTRUCTURE

Development of new solid waste and recycling facilities will take several years due to financing, permitting, and construction timelines. In the near term, the Authority must rely on existing solid waste infrastructure to provide for their near-term solid waste and recycling needs.

5.2 EXISTING FACILITIES OWNERSHIP

The majority of the existing solid waste infrastructure within the County is owned and operated by private entities. The Authority does not have control or a voice in the development, construction, operation and governance of these privately held facilities, which could represent an impediment to the Authority's ability to address solid waste and recycling efforts, should the Authority choose to segregate certain waste streams and process/dispose/recycle these waste streams in a manner that is not aligned with the existing technologies of the privately held facilities.

5.2.1 Existing Facilities Technology and Age

The technologies selected for the development of the existing solid waste infrastructure may not be aligned with the goals and objectives of the Authority, which is ultimately to maximize recycling and recovery of materials as well as the diversion of materials from landfills and waste to energy. Additionally, the age, condition, and ability of the existing facilities to continue processing solid waste and recyclables for the near and long-term will vary and, in some instances, will require a physical condition assessment to determine definitively. Therefore, both the existing facility technology and age may be an impediment to the Authority addressing solid waste and recycling efforts.

5.2.2 Existing Facility Processing and Expansion Capacity

The processing capacity of existing facilities may be difficult to modify in order to increase capacity and/or upgrade or change the solid waste/recycling technology of these facilities due to physical constraints of the facility or site, environmental permitting constraints, and public opposition to expansion. All of which could represent an impediment to the Authority addressing solid waste and recycling efforts.

5.2.3 Existing Facility Location and Transportation Logistics

An overworked and geographically limited transportation grid system, that has one of the highest average annual daily traffic rates in the State of Florida, combined with the location of existing facilities and limited availability of vacant land for the development of new facilities, will likely present hauling and transportation logistical issues, which could represent an impediment to the Authority addressing solid waste and recycling efforts. Transportation logistics will be further explored and evaluated in Task 7 – Implementation Plan and Timelines White Paper.

5.2.4 Available Land

The availability of land necessary for the development of solid waste and recycling facilities will be determined as part of Task 6 - Recommendations and Findings. However, according to the Broward County Urban Planning Director, there is approximately 12-square miles of developable vacant land remaining in the County[22], which must be evaluated in consideration of size, configuration, land use and zoning, proximity to thoroughfares, residential communities, and natural areas. Based on the limited supply of developable vacant land, availability of land will likely be an impediment to the Authority addressing solid waste and recycling efforts.

5.2.5 Environmental Justice and NIMBY

According to the USEPA, the term environmental justice is defined as: “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies”[23]. Siting of any new solid waste facility, including recycling facilities, likely will have environmental justice concerns due to the limited availability of vacant land and the County being highly urbanized. The likelihood that a solid waste or recycling facility will be constructed near residential communities is high and may result in environmental justice impacts and public opposition. Opposition by local residents can increase the time, complexity, and costs for the development of new facilities. This type of opposition to community changes has been termed “Not

[22] https://www.yahoo.com/news/wanted-more-200-000-additional-164400305.html?
[23] https://www.epa.gov/environmentaljustice

In My Backyard" (NIMBY) and has been observed in municipalities throughout the US for many years. Environmental Justice concerns and public opposition to the siting of solid waste facilities in the County is expected for any new facility and could be a potential impediment to the Authority addressing solid waste and recycling efforts.

5.3 FRANCHISE AGREEMENTS, FINANCING AND AFFORDABILTIY

5.3.1 Agreement Termination Dates and Facility Development Phasing

After review of the existing franchise agreements for solid waste and recycling collection and disposal, it was found that these agreements are generally not coterminous and have initial expiration dates ranging from 2024 through 2031, include term extensions of varying durations, and some agreements do not include "termination for convenience" clauses. This will increase the complexity of establishing a timeline of available solid waste facilities and phasing in of various municipal waste streams, which may represent a potential impediment to the Authority addressing solid waste and recycling efforts.

5.3.2 Financing and Bonding Capabilities

A number of financing instruments exist for funding large municipal capital projects. The ILA provides the Authority with the power to impose, levy, and collect, special assessments in order to finance the acquisition, construction, maintenance, operations, and other capital necessary to provide solid waste and recycling services to ILA members. Additionally, the Authority can utilize funds collected through special assessments to pay principal and interest on bonds issued to fund the implementation of the Authority's facilities. The Authority will need to be evaluated for a bond rating from a credit rating agency. Bond ratings may impact the interest rate at which the Authority can borrow funds. Ratings agencies typically consider qualitative and quantitative factors to assess creditworthiness. Evaluation factors include items such as the organizational structure and management strength, along with debt levels and financial ratios. The bond rating, which could directly impact the cost of borrowing, could represent a potential impediment to the Authority addressing solid waste and recycling efforts.

5.3.3 Affordability

Affordability, as it relates to the Authority, can be defined as the ILA residents' capacity and ability to pay the rates for solid waste and recycling services, while still receiving the revenue needed to maintain operations. Low-income households may face affordability issues and other associated hardships. In developing the rate structure and special assessment required to fund the Authority's solid waste and recycling facilities, operations, and maintenance, the ability for low-income households to afford the required rates should be considered. A benchmarking study to assess the rates in comparison to existing solid waste rates currently being paid throughout the County and other nearby counties in Florida could be conducted to assist in determining affordability. However, affordability could represent a potential impediment to the Authority addressing solid waste and recycling efforts.

5.4 PERMITTING AND REGULATORY CONCERNS

Environmental permitting is required to construct and implement solid waste facilities. Federal, State, and regional environmental permitting requirements, policies and jurisdictional interfaces

required to site, construct and operate a new facility must be considered and adhered to, in order to successfully permit a solid waste facility. Environmental permitting requirements may limit the size, throughput capacity, and location of a solid waste or recycling facility, which could represent a potential impediment to the Authority addressing solid waste and recycling efforts. Furthermore, implementation of policies that would restrict the use of certain classifications of the waste stream (e.g., plastic bags) are currently prevented by Florida pre-emption rules, and therefore, would represent existing regulatory impediment to the Authority's solid waste or recycling efforts. A more detailed review of permitting and regulatory concerns will be provided in Task 5 – Regulatory Requirements and Policy Review White Paper.

5.5 EDUCATION OUTREACH, CONTAMINATION, COMPLIANCE, AND ENFORCEMENT

Implementation of new solid waste and recycling facilities may require changes to County resident behavior, especially if segregation of different solid waste streams is required. Contamination of segregated solid waste streams is a significant issue that affects both the quantity, quality, and value of these waste streams. Development of a robust education and outreach program in order to educate residents and businesses on the proper techniques and practices associated with the collection of new waste streams will be required. Resident and business' compliance with proper techniques is essential to the success of any solid waste program, therefore, oversight and enforcement including issuance of monetary fines and refusal of service could be required. Enforcement actions may lead to increased instances of illegal dumping throughout the County. Education, contamination, compliance, and enforcement are all potential impediments to the Authority addressing solid waste and recycling efforts.

5.6 COMMERCIAL RECYCLING FLOW CONTROL

Article 11.2 of the Authority ILA directs all municipalities that are part of the ILA to commit and send their waste to facilities within the Authority's system, which effectively captures all residential solid waste and recyclable materials. However, Florida law prohibits a local government from dictating where a commercial establishment must direct its source-separated recyclable materials but does not prohibit mandating commercial recycling[24], which could represent an impediment to the Authority addressing solid waste and recycling efforts.

[24] Section 403.7046 (2) F.S. Except as otherwise provided in this section or pursuant to a special act in effect on or before January 1, 1993, a local government may not require a commercial establishment that generates source-separated recovered materials to sell or otherwise convey its recovered materials to the local government or to a facility designated by the local government, nor may the local government restrict such a generator's right to sell or otherwise convey such recovered materials to any properly certified recovered materials dealer who has satisfied the requirements of this section. A local government may not enact any ordinance that prevents such a dealer from entering into a contract with a commercial establishment to purchase, collect, transport, process, or receive source-separated recovered materials.

Appendix A

ILA Member Population and Collection/Disposal Contracts Summary

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
Large Members' ILAs								
Coral Springs	134,394	Coastal Waste & Recycling	MSW: (2/wk) Recyclables:(1x/wk) Yard Trash: (1/wk) C&D: (1/wk) White Goods: (1/wk) Electronics: (1/wk) HHW: N/A	Annually: Collection: $ 107.03 Recycling: $ 34.00 Disposal: $ 123.80 Administration: $ 7.91 Franchise Fee: $ 76.32 Contingency: $ 6.14 Early Payment Discount: $ 14.80 Annual Residential Assessment: $ 370	Solid Waste: South Broward RRF (1) Recycling: WM Recycling Deerfield (Sun 11) (1) C&D/White Goods: WM Recycling Deerfield (1)	07/23/2023	N	9/30/2031

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
Davie	105,691	Coastal Waste & Recycling	MSW: (2x/wk) Recyclables: included in MSW Yard Trash: included in White Goods C&D: N/A White Goods: (1x/mo) Electronics: N/A HHW: N/A	Collection: $ 114.6 (Annually) Recycling: NP Disposal: $ 150 (Annually) Administration: NP Franchise Fee: 54.72 (Annually) Broward County Fee: $0.50 (Annually) Legal services: $0.16 (Annual) Legal Ad: $0.03 (Annual) HHW Fee: $ 0.95 (Annual) White Goods Drop off: $6.12 (Annual) Discount: $13.63 (Annual) Annual Residential Assessment: $ 340.71	Solid Waste: South Broward RRF (1) Recycling: South Broward RRF (1) C&D/White Goods: WM Oakes Road (1)	1/20/2021 (7 Years)	N	12/31/2030

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
Deerfield Beach* **	86,859	Municipality	MSW: (2/wk) Recyclables:(N/A) Yard Trash: (1/wk) C&D: On Call White Goods: (1/wk) Electronics: (1/wk) HHW: N/A	Annual Residential Assessment: $319.32 (Based on provided $ 26.61 monthly rate)	Solid Waste: WCF Deerfield Beach Transfer Station (1) Recycling: Residential drop off location or WM Recycling Deerfield for commercial recycling (1) C&D/White Goods: WCF Deerfield Beach Transfer Station (1)	12/23/2023	Y	12/23/2026
Fort Lauderdale	182,760	WM	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (1/wk)) C&D: N/A White Goods: (1/mo) Electronics: On call - weekly HHW: Collection Events	Collection: NP Recycling: NP Disposal: NP Administration: NP Annual Residential Assessment: $ 571.32	Solid Waste: South Broward RRF (1) Recycling: Reuter Recycling (1) C&D/White Goods: WM Oakes Rd or Monarch Hill Landfill (1)	7/31/2023 (7 Years)	Y	7/30/2030
Hollywood	153,067	Waste Pro	MSW: (2x/wk) Recyclables: (1x/wk) Yard Trash: (1x/Wk) C&D: N/A White Goods: (1x/mo)	Collection: $ 27.50 Recycling: included with collection Disposal: $ 11.50 Administration: $8.00 Annual Residential	Solid Waste: Broward South RRF (1) Recycling: Broward South RRF (1) C&D/White	NP	Y	9/30/2029**

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
			Electronics: (2x/yr) HHW: N/A	Assessment: $564.00	Goods: WM Oakes Road (1)			
Lauderhill	74,482	WM	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: Yes (frequency is unclear) C&D: N/A (not exclusive) White Goods: (1/mo, 2x in December) Electronics: N/A HHW: N/A	Residential Collection: $23.70 Disposal: NP Administration: NP Optional Back Door Service: $53.98 Estimated Annual Residential Assessment: $284.40 (based on $23.70 monthly rate provided)	Solid Waste: South Broward RRF (1) Recycling: Reuter Recycling (1) C&D/White Goods: WM Oakes Rd (1) HHW: Broward Drop-off Centers Electronic Waste: Broward Drop-off Centers	8/29/2016 (3, 5 Years)	N	9/30/2026
Miramar	134,721	Waste Pro	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (1/mo with White Goods) C&D: N/A White Goods: (1/mo) Electronics: (1/mo) HHW: (1/mo)	Collection: $ 20.49 Disposal: $ 9.48 Administration: $ 2.97 Annual Residential Assessment: NP; $395.28 (based on above provided rates)	Solid Waste: South Broward RRF (1) Recycling: Reuter Recycling (1) C&D/White Goods: WM Oakes Rd	4/13/2022 (7 Years)	N	4/30/2029

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
Plantation	91,750	WM	MSW: (2/wk) Recyclables:(2/wk) Yard Trash: (2/wk) C&D: Not a part of service White Goods: (1/mo) Electronics: Quarterly Drop-off HHW: Quarterly Drop-off	Collection: NP Recycling: NP Disposal: NP Administration: NP Annual Residential Assessment: $267.48 (based on $22.29 monthly rate provided for Pay as you throw customers) OR $399.48 (based on $33.29 monthly rate provided for curbside cart customers)	Residential MSW: South Broward RRF (1) Commercial MSW: South Broward RRF (1) Residential Source Separated Recyclables: Reuter Recycling (1) Commercial Source Separated Recyclables: Reuter Recycling (1) C&D and White Goods: South Broward RRF (1)	10/01/2016 (expired on 9/30/2023 and renewed for additional 5-year term)	Y	9/30/2028

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
Sunrise	97,335	Republic Services	MSW: (2x/did not say unit of time) Recyclables: (1x/did not say unit of time) Yard Trash: (Responded that this is included with MSW or White Goods) C&D: N/A White Goods: (1x/did not say unit of time) Electronics: N/A	Collection: $18.75 (Class 1 customer) or $10.38 (Class 2 customer) Recycling: $ 2.06 Disposal: $30,354.54 (2023) Administration: $ 91,063.64 (2023) Annual Residential Assessment: NP Extra Pickup/White Goods Charge (per yard): $37.25	Residential MSW: South Broward RRF (1) Commercial MSW: South Broward RRF (1) Residential Source Separated Recyclables: South Broward RRF (1) Commercial Source Separated Recyclables: Envirocycle (1) C&D and White Goods: WM Oakes Road (1)	11/16/2023 (approx. 5 Years)	N	1/31/2030
Medium Members' ILAs								
Coconut Creek	57,833	Republic Services	MSW: (2x/wk) Recyclables: N/A Yard Trash: (1x/did not say unit of time) C&D: N/A White Goods: (1x/did not say unit of time) Electronics: (2x/yr) HHW: N/A	Collection: $282.25 Recycling: $ 0 Disposal: $ 94.32 'Other programs': $45.41 Administration: NP Annual Residential Assessment: $ 342.89	Solid Waste: WM Recycling Deerfield or South Broward RRF (1) Recycling: City drop-off facilities (1) or WM Recycling – Deerfield / Davie (1) C&D/White Goods: Waste Connections	10/1/2019 (5 Years)	N	9/30/2026

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
					Deerfield (1) or South Broward RRF (1)			
Cooper City	34,401	Coastal Waste & Recycling	MSW: (2/wk) Recyclables:(1/wk) Yard Trash commingled and MSW: (2/wk)) C&D: N/A Bulk/White Goods: (1/mo) Electronics: (12/Yr) HHW: (12/yr)	Collection: $ 18.56 Recycling: $ 79.13 Disposal: $ 103.69 Administration: $ 6,080 Annual Residential Assessment: $ 396.60	Solid Waste: South Broward RRF (1) Recycling: WM Reuters PP (1) or WM Davie Transfer (1); C&D/White Goods: WM Oakes Rd (1)	1/9/2024 (7 Years)	Y	3/31/2031
Lauderdale Lakes	35,954	WM	MSW: (2x/wk) Recyclables: (1x/wk) Yard Trash: N/A C&D: N/A White Goods: (1x/mo) Electronics: N/A HHW: N/A	Collection: $ 13.84 Recycling: $ 3.41 Disposal: $ 7.17 Administration: $ 11.37 Annual Residential Assessment: $ 429.48 (assumed based on the provided above rates)	Solid Waste: WM Recycling Deerfield (2) or South Broward RRF (1) Recycling: WM Deerfield Recycling, or other facility directed by WM. (1) C&D/White Goods: WM Oakes Road (3) with Bulky Waste and Yard Waste sent to South Broward RRF (1)	12/9/2009 (Unknown)	N	9/30/2029

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
Margate	58,712	Republic Services	MSW: (2/wk) Recyclables:(2/wk) Yard Trash: (1/wk)) C&D: N/A White Goods: (1/yr) Electronics: (3/yr) HHW: (3/yr)	Collection: $ 19.26 Recycling: $ 5.48 Disposal: $ 9.13 Administration: NP Annual Residential Assessment: $ 406.44 (based on above provided rates)	Solid Waste: South Broward RRF (1) Recycling: South Broward RRF (1) C&D/White Goods: South Broward RRF (1)	2/1/2022 (7 Years)	N	9/30/2029
North Lauderdale	44,794	WM	NP	Collection: NP Recycling: NP Disposal: NP Administration: NP Annual Residential Assessment: $378.96 (based on $31.58 monthly rate per unit established in amendment)	Solid Waste: South Broward RRF (3) or Monarch Hill LF (2) Recycling: South Broward RRF (1) C&D/White Goods: WM Recycling Deerfield (3)	7/13/2021 (7 Years)	N	12/31/2026
Oakland Park***	44,229	Municipality	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (1/mo with bulk)) C&D: as requested, for fee Bulk Goods: (1/mo) Electronics: with bulk trash HHW: N/A	Collection: NP Recycling: NP Disposal: NP Administration: NP Annual Residential Assessment: $340	Solid Waste: WCF Deerfield Beach R&T (1) Recycling: WM Deerfield (1) C&D (Not collected) /White Goods: WM Recycling - Deerfield (1)	N/A	Y	N/A

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
Parkland	34,670	WM	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (2/wk) C&D: N/A White Goods: (1/mo) Electronics: N/A HHW: N/A	Collection: $34.47 Recycling: $3.30 Disposal: NP Administration: NP Annual Residential Assessment: $453.24	Solid Waste: South Broward RRF (1) Recycling: WM Recycling - Deerfield (1) C&D/White Goods: WM Recycling – Deerfield (1)	4/23/24 (5 Years)	N	9/30/2029
Tamarac	71,897	WM	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (1/wk)) C&D: N/A Residential White Goods: (1/wk) Commercial/ Multifamily White Goods: 1/mo Electronics: (1/mo) Other: (1/mo)	Collection: NP Recycling: $4.77 Disposal: NP Administration: NP Cost per residential unit for collections: $16.99	Residential MSW: Broward South RRF (1) Commercial MSW: Broward South RRF (1) Residential Source Separated Recyclables: WM Recycling Deerfield (1) Commercial Source Separated Recyclables: WM Recycling Deerfield or Reuter Recycling (1) C&D and White Goods: WM Deerfield (Sun 2) (1)	6/24/2024 (7 Years)	Y	9/30/2031

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
Weston	68,107	Republic Services	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (2/wk) C&D: N/A Bulk Waste : (4/Yr) Electronics: 2/yr HHW: 2/yr	Collection: NP Recycling: NP Disposal: NP Administration: NP Annual Residential Assessment: $ 422.23	Solid Waste: Reuter Recycling (2) Recycling: Reuter Recycling (2) C&D/White Goods: Reuter Recycling (2)	3/5/2024 (5 Years)	Y	3/31/2029
Small Members' ILAs								
Broward (Unincorporated)	15,462	Coastal Waste & Recycling of FL	NP	MSW Collection & Disposal: $ 168/unit Recycling Collection & Processing: $96/ton for processing fee to hauler Disposal: $102.12/unit Administration: NP Annual Residential Assessment: $350	Solid Waste: South Broward RRF (1) or WM Recycling Deerfield (2) Recycling: Coastal Recycling #4 (1) C&D/White Goods: WM Oaks Rd (1)	NP	NP	4/30/2029
Dania Beach	31,723	WM	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (1/mo) C&D: (1/Mo) White Goods: (1/mo) Electronics: N/A	MSW Collection & Disposal: $ 27.02 Recycling Collection & Processing: $ 6.52 Administration: NP Annual Residential Assessment: $	Solid Waste: South Broward RRF (1) Recycling: WM Deerfield Transfer Station or South Broward RRF (1) C&D/White	12/1/2015 (7 Years)	Y	9/30/2027

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
				404.64 (based on above provided rates)	Goods: WM Oakes Rd (1)			
Hillsboro Beach	1,987	Waste Pro	NP	NP	Solid Waste: WCF Deerfield Beach Recycling & Transfer (2) Recycling: WM Recycling Deerfield/Davie (2) C&D/White Goods: WM Oakes Rd (3)	NP	NP	N/A
Lauderdale-by-the-Sea	6,198	Waste Pro	NP	NP	Solid Waste: Deerfield Beach Transfer and Recycling (2) Recycling: WM Recycling – Deerfield or Davie (2) C&D/White Goods: Deerfield Beach Transfer and Recycling (3)	11/1/2021 (3-5 Years)	N	10/31/2026
Lazy Lake	33	Coastal Waste & Recycling	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (1/wk)) C&D: N/A White Goods: (1/mo)	Collection: NP Recycling: NP Disposal: NP Administration: NP Annual Residential Assessment: $360 (based on $30 monthly rate	Solid Waste: South Broward RRF (2) Recycling: Reuter Recycling (2) C&D/White	12/15/2023 (7 Years)	N	9/30/2030

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ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
			Electronics: N/A HHW: N/A	established in contract)	Goods: WM Oakes Rd (3)			
Lighthouse Point	10,486	WM	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (2/wk)) C&D: N/A White Goods: (2/wk) Electronics: N/A HHW: N/A	Collection: NP Recycling: NP Disposal: NP Administration: NP Annual Residential Assessment: $575.28 for structures with <4 units) or $525.48 for structures with >4 units)	Solid Waste: Waste Management Deerfield (1) Recycling: Waste Management Deerfield (1) C&D/White Goods: Waste Management Deerfield (1)	3/26/2024 (7 Years)	Y	9/30/2028
Pembroke Park	6,260	WM	NP	NP	Solid Waste: Pembroke Park Transfer and Recycling (2) Recycling: Pembroke Park Transfer and Recycling (2) C&D/White Goods: WM Recycling Dania Beach (3)	NP	NP	12/31/2025**

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
Sea Ranch Lakes	540	WM	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: No response C&D: N/A White Goods: (1/mo) Electronics: N/A HHW: N/A	NP	Solid Waste: WM Recycling Deerfield (3) Recycling: WM Recycling Deerfield (3) C&D/White Goods: WM Recycling Deerfield (3)	5/28/2010 (approx. 3 Years)	NP	2/28/2025
Southwest Ranches	7,607	WM	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (2/mo) C&D: No response White Goods: (2/mo) Electronics: (4/yr) HHW: (4/yr)	Collection: $ 29.31 ($22.75 MSW; $6.56 Recycling) Disposal: $ 11.88 ($8.83 MSW; $3.05 Recycling processing) Administration: NP Annual Residential Assessment: $ 554.57	Solid Waste: Reuter MRF (1) Recycling: Reuter MRF (1) C&D/White Goods: Reuter MRF (1)	7/28/2022 (approx. 8 Years)	N	9/30/2030
West Park	15,130	Waste Pro	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: (1/Mo) C&D: N/A White Goods: N/A Electronics: N/A HHW: N/A	Collection: NP Recycling: NP Disposal: NP Administration: NP Annual Residential Assessment: $ 500.52	Solid Waste: South Broward RRF (2) Recycling: Reuter Recycling (2) C&D/White Goods: WM Oakes Rd (3)	10/18/2020 (up to 5 years per term)	N	12/31/2025
Wilton Manors	11,426	Coastal Waste & Recycling	MSW: (2/wk) Recyclables:(1/wk) Yard Trash: No response C&D: No response	Collection/ Disposal of MSW: $32.15 Recycling: $8.75	Residential MSW: Broward South RRF (1)	9/12/2023 (3 Years)	Y	9/30/2026

ILA Member	Population*	Collection Hauler	Level of Service	Cost of Service****	Material Destination	Contract Agreement Date & Term	Termination Clause	Contract End Date
			White Goods: (1/mo) Electronics: (1/mo) HHW: (1/mo)	Bulk: $8.65 HHW: $1.75 Administration: ($95k Paid annually by contractor to City) Annual Residential Assessment: $ 555.24	Commercial MSW: Broward South RRF (1) Residential Source Separated Recyclables: WM Recycling Deerfield (1) Commercial Source Separated Recyclables: Coastal Waste & Recycling #4 (1) C&D and White Goods: WM Deerfield (Sun 11) (1)			

* Population is based on the 2020 Census
** This data was provided by Solid Waste and Recycling Services, otherwise the dates listed were from provided collection and hauling contracts
*** This Municipality provides its own collection services
**** Costs are displayed monthly except for the annual residential assessment per dwelling unless otherwise stated.
(1) Destination information was determined based on review of collection and hauling contracts or was confirmed by the municipality
(2) Destination information was provided by the Authority or determined from municipal website
(3) Destination information was assumed based on distance, collector, facility owner and permit of nearby facilities
NP – Contract or information not provided
N/A – The municipality hauls its own waste

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Appendix B

Existing Permitted Solid Waste Facilities Serving Broward County

Table 1. Existing Permitted Solid Waste Facilities Serving Broward County

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity[1]
Landfill	**Broward County Landfill**	Broward County	7101 SW 205th Avenue Southwest Ranches, FL 33332	Class III	Approx 9 years of life remaining for the current cell
	Monarch Hill Landfill	WM	2700 Wiles Road Pompano Beach, FL 33073	MSW; C&D; White Goods	Approx 5-7 years of life remaining (pending land use approval/expansion)
	Medley Landfill	WM	9350 NW 89th Avenue Medley, FL 33178	Class I, Class III, Yard Trash and C&D waste	Approx 14.3 years of life remaining (pending land use approval/expansion)
	Okeechobee Landfill	WM	10800 NE 128th Avenue Okeechobee, FL 34972	Class I, Class III, Yard Trash and C&D waste	Approx 150 years of life remaining
WTE	**Broward County South RRF**	WIN Waste Innovations	4400 South State Road 7 Fort Lauderdale, FL 33314	MSW; Yard trash; C&D	**Processing**: 2,250 tons/day (all waste streams)

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity[1]
MRF	**Reuter Recycling of Florida**	WM	20701 Pembroke Road Pembroke Pines, FL 33029	Class I; Class III; C&D; Yard trash;	**Processing**: 5,660 tons/day (all waste streams)
	Pembroke Park R&T	Waste Connections of Florida	1899 SW 31st Avenue Pembroke Park, FL 33009	Class I; Recyclables	**Processing**: 1,200 tons/day (all waste streams)
	WM Recycling Oakes Road (Sun 14)	WM	3250 SW 50th Avenue Davie, FL 33314	C&D; Class III; Yard trash;	**Processing**: 5,100 tons/day (all waste streams)
	All County Waste Recycling	All County Waste Recycling Inc	1810 SW 42nd Way Deerfield Beach, FL 33442	C&D; Yard trash; White Goods; Recovered materials	**Processing**: 1,700 tons/day (all waste streams)
	WCF Deerfield Beach R&T	Waste Connections of Florida	1751 SW 43rd Terrace Deerfield Beach, FL 33442	Class I; Class III; C&D; Yard trash; Clean debris; Recovered materials	**Processing**: 1,440 tons/day (to be expanded to 2,440 tons/day (all waste streams)
	WM Recycling Deerfield	WM	1750 SW 43rd Terrace Deerfield Beach, FL 33442	Class I; Class III; C&D	**Processing**: West side: 4,000 tons/day of Class I and 325 tons/day of recovered materials; East side: 2,400 tons/day of Class III & C&D
	Coastal Nineteen MRF	Coastal Waste & Recycling of Florida	7061 SW 22nd Court Davie, FL 33317	C&D; Yard Trash; Class III; Clean debris; Recovered materials	**Processing**: 360 tons/day (all waste streams)
	Panzarella MRF	Panzarella MRF LLC	1601 SW 3rd Street Pompano Beach, FL 33069	C&D; Yard Trash; Class III; Clean debris; Recovered materials	**Processing**: 192 tons/day (all waste streams)
	Coastal Waste & Recycling #4	Coastal Waste & Recycling of Florida	1840 NW 33rd Street Pompano Beach, FL 33064	C&D; Yard Trash; Class III; Clean debris; Recovered materials	**Processing**: 2,160 tons/day (all waste streams)

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity[1]
	Envirocycle	Envirocycle, Inc.	849 SW 21st Terrace Fort Lauderdale, FL 33312	C&D; Recovered materials	**Processing**: 1,200 tons/day (all waste streams)
	WM Recycling Pompano (Sun 2)	WM	2281 NW 16th Street Pompano Beach, FL 33069	C&D; Yard Trash; Class III; Clean debris; Recovered materials	**Processing**: 2,400 tons/day (all waste streams)
	WM Recycling Dania Beach (Sun 3)	WM	3251 SW 26th Terrace Fort Lauderdale, FL 33312	C&D; Yard trash; Clean debris	**Processing**: Not described in the permit
Transfer Stations	**WM Davie Transfer Station**	WM	2380 College Avenue Davie, FL 33317	Class I; Recovered materials	**Processing**: 2,000 tons/day (all waste streams)
Drop Off Centers	**Broward County North Drop-Off Center**	Broward County	2780 N Powerline Road Pompano Beach, FL 33073	Yard trash; White Goods; HHW; E-Waste; Tires	Not available
	Broward County Central Drop-Off Center	Broward County	5490 Reese Road Davie, FL 33314	Yard trash; White Goods; HHW; E-Waste; Tires	Not available
	Broward County South Drop-Off Center	Broward County	5601 W Hallandale Beach Boulevard Pembroke Park, FL 33023	Yard trash; White Goods; HHW; E-Waste; Tires	Not available
	Deerfield Beach Main Recycling Drop Off	City of Deerfield Beach	401 SW 4th Street Deerfield Beach, FL 33441	Recyclables; Food waste; Certain HHW materials	Not available
	Coral Springs Waste Transfer Drop Off	City of Coral Springs	12600 Wiles Road Coral Springs, FL 33076	Organics for composting; White Goods; Recyclables & Yard trash	Not available

1. Capacity determined by review of facility permits.

Table 2. Existing Permitted Solid Waste Facilities Serving Broward County by Accepted Material Type

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity
Class I MSW	**Monarch Hill Landfill**	WM	2700 Wiles Road Pompano Beach, FL 33073		Approx 5-7 years of life remaining
	Medley Landfill	WM	9350 NW 89th Avenue Medley, FL 33178	Class I, Class III, Yard Trash and C&D waste	Approx 14.3 years of life remaining (pending land use approval/expansion)
	Okeechobee Landfill	WM	10800 NE 128th Avenue Okeechobee, FL 34972	Class I, Class III, Yard Trash and C&D waste	Approx 150 years of life remaining
	Broward County South RRF	WIN Waste Innovations	4400 South State Road 7 Fort Lauderdale, FL 33314	MSW	**Processing**: 2,250 tons/day (all waste streams)
	Reuter Recycling of Florida	WM	20701 Pembroke Road Pembroke Pines, FL 33029	Class I	**Processing**: 5,660 tons/day (all waste streams)
	Pembroke Park R&T	Waste Connections of Florida	1899 SW 31st Avenue Pembroke Park, FL 33009	Class I	**Processing**: 1,200 tons/day (all waste streams)
	WCF Deerfield Beach R&T	Waste Connections of Florida	1751 SW 43rd Terrace Deerfield Beach, FL 33442	Class I	**Processing**: 1,440 tons/day (to be expanded to 2,440 tons/day (all waste streams)
	WM Recycling Deerfield	WM	1750 SW 43rd Terrace Deerfield Beach, FL 33442	Class I	**Processing**: West side: 4,000 tons/day of Class I
	WM Davie Transfer Station	WM	2380 College Avenue Davie, FL 33317	Class I	**Processing**: 2,000 tons/day (all waste streams)

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity
C&D Waste	**Monarch Hill Landfill**	WM	2700 Wiles Road Pompano Beach, FL 33073	C&D	Approx 5-7 years of life remaining
	Medley Landfill	WM	9350 NW 89th Avenue Medley, FL 33178	Class I, Class III, Yard Trash and C&D waste	Approx 150 years of life remaining
	Okeechobee Landfill	WM	10800 NE 128th Avenue Okeechobee, Florida 34972	MSW	**Processing**: 2,250 tons/day (all waste streams)
	Reuter Recycling of Florida	WM	20701 Pembroke Road Pembroke Pines, FL 33029	C&D	**Processing**: 5,660 tons/day (all waste streams)
	Broward County South RRF	WIN Waste Innovations	4400 South State Road 7 Fort Lauderdale, FL 33314	C&D	**Processing**: 2,250 tons/day (all waste streams)
	WM Recycling Oakes Road (Sun 14)	WM	3250 SW 50th Avenue Davie, FL 33314	C&D	**Processing**: 5,100 tons/day (all waste streams)
	All County Waste Recycling	All County Waste Recycling Inc	1810 SW 42nd Way Deerfield Beach, FL 33442	C&D	**Processing**: 1,700 tons/day (all waste streams)
	WCF Deerfield Beach R&T	Waste Connections of Florida	1751 SW 43rd Terrace Deerfield Beach, FL 33442	C&D	**Processing**: 1,440 tons/day (to be expanded to 2,440 tons/day (all waste streams)
	WM Recycling Deerfield	WM	1750 SW 43rd Terrace Deerfield Beach, FL 33442	C&D	**Processing**: East side: 2,400 tons/day
	Coastal Nineteen MRF	Coastal Waste & Recycling of Florida	7061 SW 22nd Court Davie, FL 33317	C&D	**Processing**: 360 tons/day (all materials)
	Panzarella MRF	Panzarella MRF LLC	1601 SW 3rd Street Pompano Beach, FL 33069	C&D	**Processing**: 192 tons/day (all waste streams)
	Coastal Waste & Recycling #4	Coastal Waste & Recycling of Florida	1840 NW 33rd Street Pompano Beach, FL 33064	C&D	**Processing**: 2,160 tons/day (all waste streams)
	Envirocycle	Envirocycle, Inc.	849 SW 21st Terrace Fort Lauderdale, FL 33312	C&D	**Processing**: 1,200 tons/day (all waste streams)
	WM Recycling Pompano (Sun 2)	WM	2281 NW 16th St, Pompano Beach, FL 33069	C&D	**Processing**: 2,400 tons/day (all waste streams)
	WM Recycling Dania Beach (Sun 3)	WM	3251 SW 26th Terrace Fort Lauderdale, FL 33312	C&D	**Processing**: Not described in the permit

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity
Class III Waste	**Broward County Landfill**	Broward County	7101 SW 205th Avenue Southwest Ranches, FL 33332	Class III	Approx 9 years of life remaining for the current cell
	Medley Landfill	WM	10800 NE 128th Avenue Okeechobee, FL 34972	Class I, Class III, Yard Trash and C&D waste	Approx 150 years of life remaining
	Okeechobee Landfill	WM	10800 NE 128th Avenue Okeechobee, FL 34972	MSW	**Processing**: 2,250 tons/day (all waste streams)
	Reuter Recycling of Florida	WM	20701 Pembroke Road Pembroke Pines, FL 33029	Class III	**Processing**: 5,660 tons/day (all waste streams)
	WM Recycling Oakes Road (Sun 14)	WM	3250 SW 50th Avenue Davie, FL 33314	Class III	**Processing**: 5,100 tons/day (all waste streams)
	WCF Deerfield Beach R&T	Waste Connections of Florida	1751 SW 43rd Terrace Deerfield Beach, FL 33442	Class III	**Processing**: 1,440 tons/day (to be expanded to 2,440 tons/day (all waste streams)
	WM Recycling Deerfield	WM	1750 SW 43rd Terrace Deerfield Beach, FL 33442	Class III	**Processing**: East side: 2,400 tons/day (all waste streams)
	Coastal Nineteen MRF	Coastal Waste & Recycling of Florida	7061 SW 22nd Court Davie, FL 33317	Class III	**Processing**: 360 tons/day (all waste streams)
	Panzarella MRF	Panzarella MRF LLC	1601 SW 3rd Street Pompano Beach, FL 33069	Class III	**Processing**: 192 tons/day (all waste streams)
	Coastal Waste & Recycling #4	Coastal Waste & Recycling of Florida	1840 NW 33rd Street Pompano Beach, FL 33064	Class III	**Processing**: 2,160 tons/day (all waste streams)
	WM Recycling Pompano (Sun 2)	WM	2281 NW 16th Street Pompano Beach, FL 33069	Class III	**Processing**: 2,400 tons/day (all waste streams)

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity
White Goods	**Monarch Hill Landfill**	WM	2700 Wiles Road Pompano Beach, FL 33073	White Goods	Approx 5-7 years of life remaining
	Medley Landfill	WM	10800 NE 128th Avenue Okeechobee, FL 34972	Class I, Class III, Yard Trash and C&D waste	Approx 150 years of life remaining
	Okeechobee Landfill	WM	10800 NE 128th Avenue, Okeechobee, FL 34972	MSW	**Processing**: 2,250 tons/day (all waste streams)
	All County Waste Recycling	All County Waste Recycling Inc	1810 SW 42nd Way Deerfield Beach, FL 33442	White Goods	**Processing**: 1,700 tons/day (all waste streams)
	Coral Springs Waste Transfer Drop Off	City of Coral Springs	12600 Wiles Road Coral Springs, FL 33076	White Goods	Not available
	Broward County North Drop-Off Center	Broward County	2780 N Powerline Road Pompano Beach, FL 33073	White Goods	Not available
	Broward County Central Drop-Off Center	Broward County	5490 Reese Road Davie, FL 33314	White Goods	Not available
	Broward County South Drop-Off Center	Broward County	5601 W Hallandale Beach Boulevard Pembroke Park, FL 33023	White Goods	Not available

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity
Yard Trash	**Broward County South RRF**	WIN Waste Innovations	4400 South State Road 7 Fort Lauderdale, FL 33314	Yard trash	**Processing**: 2,250 tons/day
	Reuter Recycling of Florida	WM	20701 Pembroke Road Pembroke Pines, FL 33029	Yard trash;	**Processing**: 5,660 tons/day (all waste streams)
	WM Recycling Oakes Road (Sun 14)	WM	3250 SW 50th Avenue Davie, FL 33314	Yard trash;	**Processing**: 5,100 tons/day (all waste streams)
	All County Waste Recycling	All County Waste Recycling Inc	1810 SW 42nd Way Deerfield Beach, FL 33442	Yard trash	**Processing**: 1,700 tons/day (all waste streams)
	WCF Deerfield Beach R&T	Waste Connections of Florida	1751 SW 43rd Terrace Deerfield Beach, FL 33442	Yard trash	**Processing**: 1,440 tons/day (to be expanded to 2,440 tons/day (all waste streams)
	Coastal Nineteen MRF	Coastal Waste & Recycling of Florida	7061 SW 22nd Court Davie, FL 33317	Yard Trash	**Processing**: 360 tons/day (all waste streams)
	Panzarella MRF	Panzarella MRF LLC	1601 SW 3rd Street Pompano Beach, FL 33069	Yard Trash	**Processing**: 192 tons/day (all waste streams)
	Coastal Waste & Recycling #4	Coastal Waste & Recycling of Florida	1840 NW 33rd Street Pompano Beach, FL 33064	Yard Trash	**Processing**: 2,160 tons/day (all waste streams)
	WM Recycling Pompano (Sun 2)	WM	2281 NW 16th Street Pompano Beach, FL 33069	Yard Trash	**Processing**: 2,400 tons/day (all waste streams)
	WM Recycling Dania Beach (Sun 3)	WM	3251 SW 26th Terrace Fort Lauderdale, FL 33312	Yard trash	**Processing**: Not described in the permit
	Broward County North Drop-Off Center	Broward County	2780 N Powerline Road Pompano Beach, FL 33073	Yard trash	Not available
	Broward County Central Drop-Off Center	Broward County	5490 Reese Road Davie, FL 33314	Yard trash	Not available
	Broward County South Drop-Off Center	Broward County	5601 W Hallandale Beach Boulevard Pembroke Park, FL 33023	Yard trash	Not available
	Coral Springs Waste Transfer Drop Off	City of Coral Springs	12600 Wiles Road Coral Springs, FL 33076	Yard trash	Not available

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity
Clean Debris	**WCF Deerfield Beach R&T**	Waste Connections of Florida	1751 SW 43rd Terrace Deerfield Beach, FL 33442	Clean debris	**Processing**: 1,440 tons/day (to be expanded to 2,440 tons/day) (all waste streams)
	Coastal Nineteen MRF	Coastal Waste & Recycling of Florida	7061 SW 22nd Court Davie, FL 33317	Clean debris	**Processing**: 360 tons/day (all waste streams)
	Panzarella MRF	Panzarella MRF LLC	1601 SW 3rd Street Pompano Beach, FL 33069	Clean debris	**Processing**: 192 tons/day (all waste streams)
	Coastal Waste & Recycling #4	Coastal Waste & Recycling of Florida	1840 NW 33rd Street Pompano Beach, FL 33064	Clean debris	**Processing**: 2,160 tons/day (all waste streams)
	WM Recycling Pompano (Sun 2)	WM	2281 NW 16th Street Pompano Beach, FL 33069	Clean debris	**Processing**: 2,400 tons/day (all waste streams)
	WM Recycling Dania Beach (Sun 3)	WM	3251 SW 26th Terrace Fort Lauderdale, FL 33312	Clean debris	**Processing**: Not described in the permit
Recyclables/ Recovered Materials	**WM Recycling Pompano (Sun 2)**	WM	2281 NW 16th Street Pompano Beach, FL 33069	Recovered materials	**Processing**: 2,400 tons/day (all waste streams)
	Pembroke Park R&T	Waste Connections of Florida	1899 SW 31st Avenue Pembroke Park, FL 33009	Recyclables	**Processing**: 1,200 tons/day (all waste streams)
	All County Waste Recycling	All County Waste Recycling Inc	1810 SW 42nd Way Deerfield Beach, FL 33442	Recovered materials	**Processing**: 1,700 tons/day (all waste streams)
	WCF Deerfield Beach R&T	Waste Connections of Florida	1751 SW 43rd Terrace Deerfield Beach, FL 33442	Recovered materials	**Processing**: 1,440 tons/day (to be expanded to 2,440 tons/day (all waste streams)
	Coastal Nineteen MRF	Coastal Waste & Recycling of Florida	7061 SW 22nd Court Davie, FL 33317	Recovered materials	**Processing**: 360 tons/day (all waste streams)
	Panzarella MRF	Panzarella MRF LLC	1601 SW 3rd Street Pompano Beach, FL 33069	Recovered materials	**Processing**: 192 tons/day (all waste streams)
	Coastal Waste & Recycling #4	Coastal Waste & Recycling of Florida	1840 NW 33rd Street Pompano Beach, FL 33064	Recovered materials	**Processing**: 2,160 tons/day (all waste streams)
	Envirocycle	Envirocycle, Inc.	849 SW 21st Terrace Fort Lauderdale, FL 33312	Recovered materials	**Processing**: 1,200 tons/day (all waste streams)
	WM Davie Transfer Station	WM	2380 College Avenue Davie, FL 33317	Recovered materials	**Processing**: 2,000 tons/day (all waste streams)

Facility Type	Facility Name	Owner / Operator	Location	Materials Accepted	Permitted Capacity
	Deerfield Beach Main Recycling Drop Off	City of Deerfield Beach	401 SW 4th Street Deerfield Beach, FL 33441	Recyclables	Not available
	Coral Springs Waste Transfer Drop Off	City of Coral Springs	12600 Wiles Road Coral Springs, FL 33076	Recyclables	Not available
HHW, E-Waste, Tires, Food Waste/Organics	**Broward County North Drop-Off Center**	Broward County	2780 N Powerline Road Pompano Beach, FL 33073	HHW; E-Waste; Tires	Not available
	Broward County Central Drop-Off Center	Broward County	5490 Reese Road Davie, FL 33314	HHW; E-Waste; Tires	Not available
	Broward County South Drop-Off Center	Broward County	5601 W Hallandale Beach Boulevard Pembroke Park, FL 33023	HHW; E-Waste; Tires	Not available
	Deerfield Beach Main Recycling Drop Off	City of Deerfield Beach	401 SW 4th Street Deerfield Beach, FL 33441	HHW, Food waste	Not available
	Coral Springs Waste Transfer Drop Off	City of Coral Springs	12600 Wiles Road Coral Springs, FL 33076	Organics for composting;	Not available

Appendix C

FDEP List of Permitted Solid Waste Facilities in Broward County

Facility WACS ID	Facility Name	Class	Class Status	Facility Address	City	State	Zip	Responsible Authority Name
53209	Broward Co South RRF Ash Monofill	WTE ASH MONOFILL	A	4400 S. STATE ROAD 7	FT. LAUDERDALE	FL	33314	WHEELABRATOR SOUTH BROWARD INC
53209	Broward Co South RRF	WASTE TO ENERGY FACILITY	A	4400 S. STATE ROAD 7	FT. LAUDERDALE	FL	33314	WHEELABRATOR SOUTH BROWARD INC
53302	City of Hallandale Transfer Station	TRANSFER STATION	E	609 NW 8TH AVENUE	HALLANDALE	FL	33009	SALVATORE SCHILLACI
53328	Broward Co Landfill	CLASS I LANDFILL	A	7101 SW 205TH AVE	FORT LAUDERDALE	FL	33332	BROWARD COUNTY SOLID WASTE AND RECYCLING SERVICES
53348	Coral Springs Transfer Station Sawgrass	TRANSFER STATION	E	12600 WILES ROAD	CORAL SPRINGS	FL	33065	CITY OF CORAL SPRINGS
53380	City of Ft.Lauderdale Waste Tire Collection Center	WASTE TIRE COLLECTION CENTER	A	2001 N.W. 6TH AVENUE	FT.LAUDERDALE	FL	33311	CITY/FT.LAUDERDALE/A.ROBERTS
54100	The Tire Source D/B/A Birchfield	WASTE TIRE COLLECTION CENTER	A	1717 S.W. 1ST WAY BAY 23	DEERFIELD BEACH	FL	33461	THE TIRE SOURCE
54107	Broward Co Central Res TS	TRANSFER STATION	E	5490 REESE ROAD	DAVIE	FL	33314	BROWARD COUNTY ENV. SERVICES
54128	WM Reuter Recycling	MATERIAL RECOVERY FACILITY - CLASS I & III	A	20701 PEMBROKE ROAD	PEMBROKE PINES	FL	33029	REUTER RECYLING INC.
54572	The Tire Source Inc.	WASTE TIRE COLLECTION CENTER	A	6701 B & C NW 15TH WAY	FT.LAUDERDALE	FL	33309	THE TIRE SOURCE INC.
54712	Envirocycle, Inc.	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	849 S.W. 21ST TERRACE	FORT LAUDERDALE	FL	33312	ENVIROCYCLE, INC.
54821	TIRE WASTE DISPOSAL OF BROWARD CO	WASTE TIRE COLLECTION CENTER	A	942 NW 44TH STREET	OAKLAND PK	FL	33309	MALCOLM BLACK
54845	Resource Metal Recycling	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	2241 NW 15TH CT	POMPANO BEACH	FL	33069	SUN RECYCLING LLC
55093	WM Monarch Hill Landfill	CLASS I LANDFILL	A	3000 NW 48TH ST (HILTON RD)	POMPANO BEACH	FL	33073	WASTE MANAGEMENT INC OF FL
55158	Coastal Nineteen MRF	MATERIAL RECOVERY FACILITY - C & D	A	7061 SW 22 COURT	FORT LAUDERDALE	FL	33317	COASTAL WASTE & RECYCLING, LLC
55245	Tire Recycling Systems, Inc.	WASTE TIRE COLLECTION CENTER	A	616 NW 2ND AVE.	FORT LAUDERDALE	FL	33311	THOMAS A BOLTON
55464	Pembroke Park R&T	MATERIAL RECOVERY FACILITY - CLASS I & III	A	1899 SW 31 AVE	HALLANDALE	FL	33009	WASTE CONNECTIONS OF FLORIDA, INC.
55468	WM Recycling Oakes Road (Sun 14)	MATERIAL RECOVERY FACILITY - CLASS I & III	A	3250 SW 50 AVE	FORT LAUDERDALE	FL	33314	WASTE MANAGEMENT INC. OF FLORIDA
55469	Resource Metal Recycling	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	1410 S POWERLINE RD	DEERFIELD BEACH	FL	33442	SUN RECYCLING LLC
55476	WM Recycling Pompano (Sun 2)	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	2281 NW 16 STREET	POMPANO BEACH	FL	33069	WASTE MANAGEMENT INC. OF FLORIDA
55476	COASTAL EIGHTEEN	SOURCE-SEPARATED ORGANICS PROC. FAC. (SOPF)	A	2281 NW 16 STREET	POMPANO BEACH	FL	33069	WASTE MANAGEMENT INC. OF FLORIDA
83764	WM Recycling Dania Beach (Sun 3)	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	3251 S.W. 26TH TERRACE	FORT LAUDERDALE	FL	33312	WASTE MANAGEMENT INC. OF FLORIDA
91491	B.G. Katz Nurseries, LLC.	SOURCE-SEPARATED ORGANICS PROC. FAC. (SOPF)	R	15800 LOXAHATCHEE ROAD	PARKLAND	FL	33076	BG KATZ
92348	All County Waste Recycling	MATERIAL RECOVERY FACILITY - CLASS I & III	A	1810 SW 42 WAY	DEERFIELD BEACH	FL	33442	ALL COUNTY WASTE RECYCLING INC.
94722	Panzarella MRF LLC	MATERIAL RECOVERY FACILITY - C & D	A	1601 SW 3RD ST	Pompano Beach	FL	33069	PANZARELLA MRF LLC
94733	WCF Deerfield Beach R&T	MATERIAL RECOVERY FACILITY - CLASS I & III	A	1751 SW 43rd Ter	DEERFIELD BEACH	FL	33442	WASTE CONNECTIONS OF FLORIDA, INC.
95284	Snyder Park Transfer Station	TRANSFER STATION	E	3299 SW 4 AVENUE	FORT LAUDERDALE	FL	33315	CITY OF FORT LAUDERDALE
95284	SNYDER PARK TRANSFER STATION	SOURCE-SEPARATED ORGANICS PROC. FAC. (SOPF)	R	3299 SW 4 AVENUE	FORT LAUDERDALE	FL	33315	CITY OF FORT LAUDERDALE
95796	WM - Southern Sanitation (WTC)	WASTE TIRE COLLECTOR	R	3831 N POWERLINE RD	POMPANO BEACH	FL	33073	
95932	SOUTH FLORIDA WATER MGMT DISTRICT	WASTE TIRE COLLECTOR	R	2535 DAVIE RD	DAVIE	FL	33317	
95958	DALE'S WHEELS & TIRES DIRECT, INC.	WASTE TIRE COLLECTOR	R	250 W SUNRISE BLVD	FORT LAUDERDALE	FL	33311	
96173	TIRESOLES OF BROWARD, INC.	WASTE TIRE COLLECTOR	R	1865 S POWERLINE RD	DEERFIELD BEACH	FL	33442	
96524	KING TIRES, INC.	WASTE TIRE COLLECTOR	R	6301 GRANT CT	HOLLYWOOD	FL	33024	
96616	IN & OUT AUTO SERVICES, INC.	WASTE TIRE COLLECTOR	R	1247 W SUNRISE BLVD	FORT LAUDERDALE	FL	33311	
96896	GALHUMA TRADING, INC.	WASTE TIRE COLLECTOR	R	1850 N STATE ROAD 7	MARGATE	FL	33063	
96941	GARFIELD MANNING	WASTE TIRE COLLECTOR	R	2230 NW 33RD AVE	LAUDERDALE LAKES	FL	33311	
97567	EARL W. COLVARD, INC.	WASTE TIRE COLLECTOR	R	4201 S STATE ROAD 7	DAVIE	FL	33314	
97593	M & B DISTRIBUTING, INC.	WASTE TIRE COLLECTOR	R	810 N DIXIE HWY	HOLLYWOOD	FL	33020	
97772	WM Recycling Deerfield	MATERIAL RECOVERY FACILITY - CLASS I & III	A	1750 SW 43RD TERRACE	DEERFIELD BEACH	FL	33442	WASTE MANAGEMENT INC OF FLORIDA
97772	WM RECYCLING DEERFIELD	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	1750 SW 43RD TERRACE	DEERFIELD BEACH	FL	33442	WASTE MANAGEMENT INC OF FLORIDA
98592	MARCE GRISSETT	WASTE TIRE COLLECTOR	R	1530 NW 3RD ST	FORT LAUDERDALE	FL	33311	
99460	WM Davie TS	TRANSFER STATION	A	2380 College Ave	FORT LAUDERDALE	FL	33317	WASTE MANAGEMENT INC. OF FLORIDA
100414	Ace Recycling Resources	SOURCE-SEPARATED ORGANICS PROC. FAC. (SOPF)	R	2250 SW 208 AVE	MIRAMAR	FL	33029	
100497	CLIFF BERRY PORT EVERGLADES	USED OIL RECYCLING	A	3400 SE 9TH AVENUE	DANIA BEACH	FL	33316	
100879	FCC ENVIRONMENTAL	USED OIL RECYCLING	A	1280 NE 48th St	Pompano Beach	FL	33064	
100932	TRIUMVIRATE ENVIRONMENTAL	USED OIL RECYCLING	A	3670 SW 47TH AVENUE	DAVIE	FL	33314	
100973	ECHO TIRES INC	WASTE TIRE COLLECTOR	R	712 NW 57TH ST	FT LAUDERDALE	FL	33309	
101456	WORLD PETROLEUM INC (FKA PMI)	USED OIL RECYCLING	A	3650 SW 47TH AVENUE	DAVIE	FL	33314	WORLD PETROLEUM CORP.
102095	MIRANDA'S TIRE INC.	WASTE TIRE PROCESSING FACILITY	A	1982 NW 44TH STREET	DEERFIELD BEACH	FL	33064	
102218	MONARCH HILL TRANSFER STATION (MHTS)	TRANSFER STATION	P	2600 WILES ROAD	POMPANO BEACH	FL	33073	
102477	A & S TIRE INC	WASTE TIRE COLLECTOR	R	2929 NW 17TH TER	OAKLAND PARK	FL	33311	
103196	COASTAL WASTE & RECYCLING OF BROWARD COUNTY, LLC	MATERIAL RECOVERY FACILITY - C & D	A	1840 NW 33RD ST	POMPANO BEACH	FL	33064	COASTAL WASTE & RECYCLING OF BROWARD COUNTY, LLC
103196	Coastal Waste & Recycling #4	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	1840 NW 33RD ST	POMPANO BEACH	FL	33064	COASTAL WASTE & RECYCLING OF BROWARD COUNTY, LLC
103252	YORACO GONZALEZ	WASTE TIRE COLLECTOR	R	721 NW 6TH AVE	FORT LAUDERDALE	FL	33311	
105585	POWERLIND SCRAP	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	2220 NORTH POWERLINE ROAD	POMPANO BEACH	FL	33069	
105657	FPT-SUNRISE	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	700 NORTHWEST 21ST TERRACE	FORT LAUDERDALE	FL	33311	
105668	STERICYCLE SID - POMPANO BEACH	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	1300 NW 22ND STREET	POMPANO BEACH	FL	33069	
105692	WMIF-REUTERS-MIAMI-WPF	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	20701 PEMBROKE ROAD	PEMBROKE PINES	FL	33029	
105719	PEMBROKE PARK RECYCLING AND TRANSFER	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	1899 SOUTHWEST 31ST AVENUE	HALLANDALE BEACH	FL	33009	
105738	TMR - POMPANO	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	811 NORTHWEST 13TH AVENUE	POMPANO BEACH	FL	33069	
105763	AMERICAN STEEL PROCESSING CO - DAVIE	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	4400 SOUTH STATE ROAD 7	DAVIE	FL	33314	
105773	SA RECYCLING 304	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	1610 NORTH POWERLINE ROAD	POMPANO BEACH	FL	33069	
105792	FLSC, LLC	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	3911 SW 47TH AVENUE, SUITE 903	DAVIE	FL	33314	
105795	ATLANTIC COAST WASTE AND RECYCLING	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	1881 SOUTHWEST 56TH AVENUE	PLANTATION	FL	33317	
105798	MST SCRAP METAL INC	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	3310 SOUTHEAST 6TH AVENUE	FORT LAUDERDALE	FL	33316	
105801	WESTROCK - FORT LAUDERDALE	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	3021 SW 1ST TERRACE	FORT LAUDERDALE	FL	33315	
105805	PANZARELLA MRF, LLC	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	1600 SOUTHWEST 2ND PLACE	POMPANO BEACH	FL	33069	
105994	SNIDER TIRE INC.	WASTE TIRE COLLECTOR	R	1414 W MCNAB RD	FORT LAUDERDALE	FL	33309	
106794	EU TIRES INC	WASTE TIRE COLLECTOR	R	5657 DAWSON ST	HOLLYWOOD	FL	33023	
107023	TIRES OF SOUTH FLORIDA	WASTE TIRE COLLECTOR	R	2169 N DIXIE HWY	POMPANO BEACH	FL	33060	
107258	PRIME TIRES BROWARD, LLC	WASTE TIRE COLLECTOR	R	3690 W BROWARD BLVD	FORT LAUDERDALE	FL	33312	
107313	SA RECYCLING 303	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	R	1157 NW 31ST AVE	LAUDERHILL	FL	33311	
107390	REAL KEEN TIRE SHOP LLC	WASTE TIRE COLLECTOR	R	195 SW 15TH ST	DEERFIELD BEACH	FL	33441	
107939	RESOURCE METAL RECYCLING	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	1701 NW 31ST AVE	LAUDERHILL	FL	33311	
107940	RESOURCE METAL RECYCLING	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	2309 SW 2ND AVE	FORT LAUDERDALE	FL	33315	
108034	AMERICAN TIRE DISTRIBUTORS, INC.	WASTE TIRE COLLECTION CENTER	P	11700 MIRAMAR PKWY	MIRAMAR	FL	33025	
108067	Fort Lauderdale Parks HQ Transfer Station	SOURCE-SEPARATED ORGANICS PROC. FAC. (SOPF)	R	3110 SW 8TH AVE	FORT LAUDERDALE	FL	33315	
108101	SOUTH FLORIDA CUSTOMZ	WASTE TIRE COLLECTOR	R	1391 NW 31ST AVE	LAUDERHILL	FL	33311	
108179	CREATIVE RECOVERY LLC	SOURCE-SEPARATED ORGANICS PROC. FAC. (SOPF)	R	5650 PLUNKETT ST	HOLLYWOOD	FL	33023	
108271	SWF Tire Disposal LLC	WASTE TIRE COLLECTOR	R	230 NE 23RD CT	POMPANO BEACH	FL	33060	
108368	SA RECYCLING 418	RECOVERED MATERIALS PROCESSING FACILITY (RMPF)	A	3700 SW 47TH AVE	DAVIE	FL	33314	

NOTE: Class Status (A=active; E=exempt; P=proposed;R=registered)

Appendix G

Task 5 White Paper – Regulatory Requirements and Policy Review

Solid Waste Authority of Broward County

Task 5 White Paper: Regulatory Requirements and Policy Review

Solid Waste Authority of Broward County
115 South Andrews Avenue, Room 122
Fort Lauderdale, FL 33301

SCS ENGINEERS

09224106.00, Task 00005 | December 17, 2024

6115 Lyons Road
Coconut Creek, FL 33073
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1.0 PURPOSE AND SCOPE

The SCS Team was tasked with reviewing regulatory requirements, policies, and best practice trends that may affect or should be considered in the development of the County's future solid waste management strategy. This white paper briefly summarizes the results of our review and includes the following:

- A general review of local, state and national solid waste, zero waste, recycling and organic regulatory trends for best practices, growth in popularity and adoption, and a current and future opinion on the likelihood of application in Broward County.

- A specific review of current ordinances, statutes, rules, regulations (including land uses), and goals at the federal, state, and local levels related to the implementation of solid waste processing and recycling efforts. This includes the identification of regulatory actions or expected regulatory changes affecting the manner in which the System will need to dispose, process, or divert particular waste types.

- An evaluation of implementing economic or regulatory flow control, comparing and contrasting the two options and determining the benefits of implementing either one or both in view of constructing, operating, and funding specific facility types.

- An overview of effectively siting new facilities to meet future processing and disposal needs, including an evaluation of possible community, political, logistical, or regulatory constraints based on the size and type of proposed facilities.

2.0 INTRODUCTION

Broward County (County) entered into an Interlocal Agreement (ILA) in 1987 with 26 of 31 municipal cities, which created the Resource Recovery Board (Board) and Resource Recovery System (System). The ILA expired in 2013, leaving all parties individually responsible to administer contracts for the disposal of their solid waste streams, or enter into a new agreement under new conditions. Legal action ensued after the ILA expiration to liquidate assets gained and distribute funds. On April 7, 2015, Broward County and the Board/System settling parties entered into a settlement agreement, which resolved litigation over the distribution of assets and liabilities resulting from the expiration of the ILA. The settlement agreement included a process for the sale of the Alpha 250 Site, with net proceeds from the sale to be distributed to the cities that are party to the litigation.

On June 14, 2016, the first amendment to the settlement agreement was entered, which delayed the sale of the Alpha 250 site. The purpose of the delay was to allow the cities and Broward County to perform a study of various solid waste and recycling issues. Specifically, the first amendment stipulated that the study evaluate and provide recommendations regarding the following:

1. How a 75 percent County-wide recycling goal may be reached.

2. Whether retaining public ownership of Alpha 250 would facilitate the meeting of that recycling goal or would provide other benefits in connection with solid waste disposal within Broward County.

3. General solid waste disposal issues as determined by the Working Group which may include options regarding flow control and potential governance or contractual structures for collaborative management of solid waste disposal.

In 2018, Arcadis, U.S., Inc., along with Kessler Consulting, Inc., developed the Solid Waste and Recycling Issues Study, (Study) which provided recommendations on various matters, including reaching a 75% countywide recycling goal, retaining ownership of public land for the construction of solid waste or recycling facilities, and other supplemental approaches to solid waste management (WM). In response to recommendations provided in the Study, a Solid Waste Working Group (SWWG) was established, consisting of eight municipal members and one County member, to develop a regional approach to managing solid waste and recycling.

The SWWG worked together to develop an ILA creating the Solid Waste and Recyclable Materials Processing Authority of Broward County, Florida (Authority), which was presented to all municipalities in the County, throughout the Summer of 2023. Twenty-eight municipalities and the County executed the ILA and agreed to participate in the Authority.

One of the Authority's first orders of business was to develop a Regional Solid Waste and Recycling Master Plan (Master Plan) that will serve as the foundation for the future of the Authority. This Memorandum presents a review of current ordinances, statutes, rules, regulations, and goals at the federal, state, and local levels related to solid waste processing and recycling, which can be utilized to develop the Master Plan.

The SCS Team conducted a general review of local, state and national solid waste, zero waste, recycling and organic regulatory trends to provide an opinion on the likelihood of application in Broward County. Based on the regulatory review findings, any regulatory actions or expected regulatory changes that could potentially affect the manner in which the System[1] will need to dispose, process, or divert a particular waste type(s), if any, are discussed in this White Paper.

In addition, a review of solid waste flow control with respect to regulatory flow control as well as economic flow control was conducted. Comparison of regulatory and economic flow control to identify the impacts of implementing one versus the other and potential implications of flow control on future solid waste facilities in Broward County are discussed in Section 3 of this white paper.

An evaluation for siting potential new facilities required to meet Broward Couty's future processing and disposal needs is being conducted separately as part of Task 4 – Future Needs Assessment.

[1] Defined in the Interlocal Agreement (executed in May 2023) as "*Authority Solid Waste, Recovered Materials, and Recyclable Materials, collectively, generated in any of the Parties' jurisdictions and/or from outside of Broward County and identified as acceptable waste to be accepted by the Authority in the Master Plan. This term does not include Hazardous Materials or any waste deemed unacceptable in the Master Plan.*"

3.0 REGULATORY REVIEW

The SCS Team conducted a review of current ordinances, statutes, rules, regulations, and goals at the federal, state, and local levels related to solid waste management and recycling. The following sections summarize the existing Federal, State, and local legislation and regulations related to solid waste, Zero Waste, recycling, and organics.

3.1 FEDERAL REGULATIONS

3.1.1 Solid Waste

The Federal Government regulates solid waste primarily through the Resource Conservation and Recovery Act (RCRA)[2] Subtitles C and D and delegates regulatory authority to the states. Subtitle C focuses on hazardous waste, whereas Subtitle D focuses on non-hazardous solid waste requirements. These are the foundational type of regulations that the United States Environmental Protection Agency (EPA) has developed and delegated to the state, which is followed by the Florida Department of Environmental Protection (FDEP).

3.1.1.1 Hazardous Waste

Simply defined, a hazardous waste is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. Hazardous wastes are regulated under RCRA Subtitle C, which has strict requirements regarding waste generator data reporting, and the collection, transport, and disposal of such wastes.

Universal Waste

The federal universal waste regulations are found in Title 40 CFR, Part 273[3] and apply to the following five types of universal waste:

- Batteries
- Pesticides
- Mercury-Containing Equipment
- Lamps
- Aerosol Cans

EPA's universal waste regulations streamline the hazardous waste management standards for certain categories of hazardous waste that are commonly generated. The streamlined regulations have several positive effects, including promoting the collection and recycling of universal waste, easing the regulatory burden on retail stores and other generators that wish to collect these wastes and transporters of these wastes, and encouraging the development of municipal and commercial programs to reduce the quantity of these wastes going to municipal solid waste landfills or combustors.

[2] https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-overview

[3] 40 CFR Part 273: https://www.ecfr.gov/current/title-40/part-273

There are also four types of regulated participants in the universal waste system:

1. Small quantity handlers of universal waste (accumulates less than 5,000 kg of universal waste),

2. Large quantity handlers of universal waste (accumulates 5,000 kg or more of universal waste),

3. Universal waste transporters, and

4. Universal waste destination facilities.

One waste material that has become a significant concern is the management of spent lithium-ion batteries, which are now found in everything from cellphones to electric vehicles (EVs). According to the EPA, most lithium-ion batteries on the market are likely to meet the definition of hazardous waste under RCRA due to their ignitable and reactive characteristics when disposed. Recycling of lithium-ion batteries is encouraged to conserve valuable resources and energy. EPA is working on updating the current universal waste standards specifically to address lithium batteries, separate from the existing universal waste general battery category[4]. The proposed changes to universal waste regulations related to lithium batteries are intended to improve safety standards, manage end-of-life lithium batteries, and promote recycling.

3.1.1.2 Non-Hazardous Waste

Federal guidelines related to development and implementation of State solid waste management plans are provided in Title 40 Code of Federal (CFR) Part 256[5]. The purpose of the State solid waste management plan is to address all solid waste in the State that poses potential adverse effects on health or the environment or provides opportunity for resource conservation or resource recovery. Aspects of solid waste management to be considered in the State plan include resource conservation, source separation, collection, transportation, storage, transfer, processing, treatment, and disposal.

State Subtitle D permit program requirements that must be met for determination of adequacy per RCRA are specified in Title 40 CFR Part 239. The criteria for general compliance standards, locating, designing, operating, groundwater monitoring, and closure requirements for municipal solid waste (MSW) landfills are provided in 40 CFR Part 258, Subparts A though F. Per 40 CFR 239.6.e[6], all new MSW landfills are required to have a permit prior to construction and operation to ensure compliance with 40 CFR Part 258. Per 40 CFR 239.6.f, all new non-municipal, non-hazardous waste disposal units that receive conditionally exempt small quantity generator (CESQG) waste are required to have a permit prior to construction and operation to ensure compliance with 40 CFR Part 257.

[4] https://www.epa.gov/hw/improving-recycling-and-management-renewable-energy-wastes-universal-waste-regulations-solar

[5] 40 CFR Part 256: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-256?toc=1

[6] 40 CFR Part 239: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-I/part-239?toc=1

3.1.1.3 Solid Waste Management Facilities - Air Quality Regulations

An overview of the air quality regulations promulgated by the EPA under Title 40 CFR that are typically applicable to either existing or new solid waste management facilities such as landfills and resource recovery/waste-to-energy facilities is provided below:

- 40 CFR Part 60 - Standards of Performance for New Stationary Sources[7]: These provisions establish EPA air pollution control standards for new, modified, and reconstructed facilities and are intended to maintain air quality in an area with the use of best emission control technologies to reduce emissions.
  - 40 CFR 60, Subpart A, Standards of Performance for New Stationary Sources (NSPS) General Provisions
  - 40 CFR 60, Subpart Cb, Emissions Guidelines and Compliance Times for Large Municipal Waste Combustors
  - 40 CFR 60, Subpart Eb, NSPS for Large Municipal Waste Combustors
    (In January 2024, EPA issued a proposed rule to amend the 40 CFR 60, Subpart Cb and Subpart Eb standards. Final promulgation of the rule is expected in November 2024. For both new and existing municipal waste combustors, the proposed rule requires compliance with more stringent emission standards. Substantial capital costs and increased operating costs are expected to be incurred by facilities to comply with the more stringent standards.)
  - 40 CFR 60, Subpart IIII, NSPS for Compression Ignition Internal Combustion Engines (CI-ICE)
  - 40 CFR 60, Subpart JJJJ, NSPS for Spark Ignition Internal Combustion Engines (SI-ICE)
  - 40 CFR 60, Subpart WWW, Standards of Performance for Municipal Solid Waste (MSW) Landfills That Commenced Construction, Reconstruction, or Modification on or After May 30, 1991, but Before July 18, 2014
  - 40 CFR 60, Subpart Cf, Emission Guidelines and Compliance Times for MSW Landfills
    (These provisions are applicable to each existing MSW landfill for which construction, reconstruction, or modification commenced before July 17, 2014. When an affected source subject to 40 CFR 60, Subpart WWW becomes subject to an approved and effective state plan for implementing 40 CFR 60, Subpart Cf, the 40 CFR 60, Subpart WWW regulation is no longer applicable.)
  - 40 CFR 60 Subpart XXX, Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014

- 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants[8]
  - 40 CFR 61, Subpart A, General Provisions
  - 40 CFR 61, Subpart M, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Asbestos

[7] 40 CFR Part 60: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-60?toc=1
[8] 40 CFR Part 61: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-61?toc=1

- 40 CFR Part 63 - National Emission Standards for Hazardous Air Pollutants for Source Categories[9]
  - 40 CFR 63, Subpart A, General Provisions
  - 40 CFR 63, Subpart AAAA, National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills
  - 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines (RICE) – This subpart establishes emission standards and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions.

- 40 CFR Part 98 - Mandatory Greenhouse Gas Reporting[10]: The mandatory greenhouse gas (GHG) reporting requires all applicable facilities to develop and maintain a monitoring plan on-site as part of the recordkeeping requirement, monitor GHG emissions, and report annual GHG emissions for each calendar year.

3.1.2 Zero Waste

The term "Zero Waste" refers to a very broad set of guiding principles that envisions altering entire economies by changing product manufacturing and producer responsibilities, consumption practices, regulations, recycling markets, and using other mechanisms to make a society less wasteful. The goal of Zero Waste is to eliminate waste at every level and steer economies towards the target of sending no waste to landfills, combustion facilities, or the ocean. For many municipalities that have adopted Zero Waste as a management strategy, the generally-accepted benchmark to achieve "Zero Waste" is the diversion of 90% of a given solid waste stream from landfilling. The Zero Waste International Alliance (ZWIA) currently defines Zero Waste as "*the conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning and with no discharges to land, water, or air that threaten the environment or human health*".

The federal government regulates waste management primarily through RCRA but does not yet address Zero Waste activities at a national level. No new regulations regarding Zero Waste strategies on a national level have been created. The federal government encourages waste minimization and recycling efforts through EPA grants and other mechanisms, which provides financial assistance to states and municipalities to encourage development of alternative solid waste programs and facilities. Legislation and programs surrounding specifically zero-waste are typically pursued at a local level (county, city, or municipality).

EPA has developed the Managing and Transforming Waste Streams Tool[11], which consists of various policies and programs that communities can adopt and implement to promote waste prevention, materials recovery and reuse, and thereby reduce the amount of waste disposed in landfills. This EPA tool can be customized as needed based on the community's needs, initiatives and capabilities.

[9] 40 CFR Part 63: https://www.ecfr.gov/current/title-40/part-63

[10] 40 CFR Part 98: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98?toc=1

[11] https://www.epa.gov/transforming-waste-tool

3.1.3 Recycling

Minimum recycling/diversion goals are defined and encouraged through Federal programs and State of Florida statutes. Currently, the EPA national recycling goal is to reach 50% by 2030, while the State of Florida recycling goal is 75%.

3.1.4 Organics

For the purposes of this evaluation, "organic waste" is defined as varied combinations of food, soiled paper, vegetative waste, and other organic (carbon-based) materials in the waste stream. The following Federal regulations are applicable to recycling organics including food waste diversion programs and are discussed in the subsections below.

1. 42 U.S.C. 1791 - Bill Emerson Good Samaritan Food Donation Act[12]
2. 7 U.S.C. 3801 Swine Health Protection Act[13]
3. 21 CFR Part 589.2000 Bovine Spongiform Encephalopathy (BSE)/Ruminant Feed Ban Rule[14]
4. National Strategy for Reducing Food Loss and Waste and Recycling Organics Policy – June 2024[15]
5. United States Environmental Protection Agency Wasted Food Scale[16]

3.1.4.1 42 U.S.C. 1791 - Bill Emerson Good Samaritan Food Donation Act

The Bill Emerson Good Samaritan Food Donation Act (Act) was enacted in order to encourage food diversion to people in need by providing donors with protection from civil and criminal liability. Liability protection under the Act is only provided as long as the donor acted in good faith to donate, recover, and distribute food to those in need. However, donated food must meet all quality and labeling standards imposed by Federal, State, local laws and regulations. There are currently no Federal laws that regulate date labeling, except for infant formula. Suggestions provided by the United Stated Department of Agriculture (USDA) and Federal Drug Administration (FDA) to food manufacturers are related to food quality and freshness, and not safety. Due to lack of federal regulation, and lack of food safety related labeling suggestions, states have enacted their own food date labeling laws. Florida has not enacted food date labeling laws and has not provided for additional liability protections for food donors.

[12] https://www.usda.gov/sites/default/files/documents/FAQs-GoodSamaritanAct.pdf

[13] https://usswinehealthimprovementplan.com/wp-content/uploads/US-SHIP-Program-Resolutions-Full-2023.pdf

[14] eCFR :: 21 CFR 589.2001 -- Cattle materials prohibited in animal food or feed to prevent the transmission of bovine spongiform encephalopathy

[15] National Strategy for Reducing Food Loss and Waste and Recycling Organics (https://www.epa.gov/circulareconomy/national-strategy-reducing-food-loss-and-waste-and-recycling-organics)

[16] From Field to Bin: The Environmental Impacts of U.S. Food Waste Management Pathways | US EPA

3.1.4.2 7 U.S.C. 3801 Swine Health Protection Act (SHPA)

The SHPA regulates food waste containing any meat products fed to swine in order to prevent the transmission of disease. SHPA requires that all food waste containing animal products be heat treated to 212° F or 100° C for at least 30 minutes in order to kill disease causing bacteria.

3.1.4.3 21 CFR Part 589.2000 Bovine Spongiform Encephalopathy (BSE)/Ruminant Feed Ban Rule (BSE Rule)

In order to prevent BSE from being transmitted to cows, goats and other ruminant livestock, the BSE Rule was implemented to prohibit the use of almost all mammalian protein (i.e., animal tissue) in feeds for ruminant animals.

3.1.4.4 National Strategy for Reducing Food Loss and Waste and Recycling Organics Policy – June 2024

The Biden-Harris Administration, along with the EPA, FDA, and the USDA, issued the National Strategy for Reducing Food Loss and Waste and Recycling Organics Policy (National Strategy) in June 2024 to reduce food loss and implement waste and recycling organics policies. Preventing food loss and waste and recycling organic waste will help in reducing the amount of such waste being diverted to landfills thereby reducing landfill methane emissions, in support of the U.S. Methane Emissions Reduction Action Plan.

The goal of the National Strategy is to prevent food loss and waste and increase the recycling of organic waste, such as food, yard, and tree trimmings along the entire food supply chain in order to reduce food loss and waste by 50% by 2030.

Review of the National Strategy identified four objectives and several strategic actions to be implemented by the EPA, FDA and USDA (Agencies) in order to implement the objectives. The four objectives included in the National Strategy are:

1. Prevent food loss.
2. Prevent food waste.
3. Increase the recycling rate for all organic waste.
4. Support policies that incentivize and encourage food loss and waste prevention and organics recycling.

The first two objectives were related to an education campaign to help the public reduce the amount of food purchased, thus reducing food loss as well as food diversion programs. Objectives Three and Four are discussed below as they are related to recycling.

Objective Three – Increase the Recycling Rate for all Organic Waste

Objective Three of the National Strategy is to increase the recycling rate for all organic waste. To achieve this objective, five strategic actions were identified, where Agencies would use grant programs to create a comprehensive organic waste recycling infrastructure which are as follows:

1. Support the development of additional organics recycling infrastructure through grants and other assistance for all communities, especially those that are underserved.

2. Expand the market for products made from recycled organic waste.

3. Enhance support to advance de-centralized (i.e., community-scale and home composting) organics recycling,

4. Build, refine, and share tools and data to aid decision-making about infrastructure investments, waste management policies, and waste management pathway destinations (e.g., composting, anaerobic digestion, landfill).

5. Address contamination in the organic waste recycling stream.

Objective Four – Support Policies that Incentivize and Encourage Food Loss and Waste Prevention and Organics Recycling.

Objective Four of the National Strategy is to develop policies at all levels of government, that incentivize and encourage the prevention of food loss and waste, the redistribution of surplus food, the development of additional organics recycling infrastructure, and expansion of markets for recycled products made from organics and soil amendments made from food and other organic waste. To achieve this objective, two strategic actions were identified, where among other efforts, Agencies would provide assistance to all levels of government for the development of policies encouraging food loss and waste prevention and organics recycling. The strategic actions associated with Objective Four are:

1. Support international policymakers aiming to build more circular economies.

2. Support Federal, Tribal, territory, state, and local policymakers aiming to build more circular economies.

To date, no Federal or State legislation has been advanced in conjunction with the National Strategy, and it is unclear if any potential legislation may result. Monitoring the development after implementation of the National Strategy stemming from the Agencies strategic actions is suggested.

3.1.4.5 United States Environmental Protection Agency Wasted Food Scale

In October 2023, the EPA published Field to Bin: The Environmental Impacts of U.S. Food Waste Management Pathways (Field to Bin Report). The purpose was to investigate the environmental impacts and contributions to a circular economy of eleven common pathways to manage wasted food, from source reduction to composting to landfilling. Based on these findings, the Field to Bin Report presented a new ranking of the eleven common wasted food pathways, from most to least

environmentally preferable. The new ranking, called the Wasted Food Scale and is shown in Figure 1, replaced the EPA's previous food recovery hierarchy that was developed in the 1990s.

Figure 1. EPA Wasted Food Scale

The intent of the Wasted Food Scale is to provide stakeholders, which includes farms, food businesses, waste managers, individual consumers, and policymakers, with advice on how to reduce the environmental impacts of wasted food. Currently it is unknown if any mandates will stem from the new Wasted Food Scale. Monitoring food waste policies developed in consideration of the new Wasted Food Scale, at the Federal, State and local levels is suggested.

3.2 STATE REGULATIONS

Laws and programs surrounding waste management are typically handled at the state and local level. The construction, operation, and maintenance of solid waste processing facilities must be in accordance with various Florida Statutes (F.S.) and Florida Administrative Code (F.A.C.). The SCS Team conducted a review of State of Florida legislation applicable to solid waste processing, Zero Waste, recycling and organics processing in the State and a summary of the review findings applicable to Broward County are provided below.

1. Chapter 62-701, F.A.C. Solid Waste Management Facilities[17]

2. Chapter 62-709, F.A.C. Criteria for Organics Processing and Recycling Facilities[18]

[17] https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-701

[18] https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-709

3. Chapter 62-730, F.A.C. Hazardous Waste[19]
4. Chapter 62-212, F.A.C. Stationary Sources – Preconstruction Review[20]
5. Chapter 62-213, F.A.C. Operation Permits for Major Sources of Air Pollution[21]
6. Chapter 62-296, F.A.C. Stationary Sources – Emission Standards[22]
7. Chapter 403, F.S. Environmental Control[23]
    I. Part II Electrical Power Plant and Transmission Line Siting
    II. Part IV Resource Recovery and Management
        a. Chapter 403.706, F.S. Local Government Solid Waste Responsibilities
    III. Part V Environmental Regulation

3.2.1 Chapter 62-701, F.A.C. Solid Waste Management Facilities

The intent of Chapter 62-701, F.A.C., Solid Waste Management Facilities, is to establish standards for the construction, operation, modification, and closure of solid waste management facilities to minimize their threat to public health and the environment. Section 62-701.300, F.A.C. also includes prohibitions on specific types of wastes allowed in solid waste facilities, including the following:

- Hazardous wastes
- PCBs
- Biomedical waste
- Lead-acid batteries
- Used oil and oily waste
- Yard trash in a Class I landfill, except as may be allowed pursuant to Section 403.708(12)(c), F.S.
- White goods
- Whole waste tires
- Liquid waste
- CCA-treated wood

[19] https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-730
[20] https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-212
[21] https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-213
[22] https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-296
[23] http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=0400-0499/0403/0403ContentsIndex.html

3.2.2 Chapter 62-709, F.A.C. Criteria for Organics Processing and Recycling Facilities

Current state regulations divide composting facilities into three categories: exempt (small quantity), registration (yard waste only), and permitted, which are described below:

1. **Exempt** – These facilities are typically either smaller (less than 100 cubic yards), including the beneficial use of yard trash or vegetative waste (that is not expected to pose a significant threat to public health), and on-farm composting or composting material to be exclusively used for farms.

2. **Registered Facility** – These facilities can process yard trash, pre-consumer vegetative waste, manure, or animal byproducts. These facilities have basic design criteria detailed in Chapter 62-709 F.A.C. A registered facility must only comply with the typical Florida stormwater regulations (Chapter 62-330 FAC).

3. **Permitted Facility** - A permitted facility will typically accept a mix of materials, notably including either wastewater treatment plant biosolids (regulated under Chapter 62-640 FAC) or post-consumer food waste (regulated under both Chapter 62-709 and Chapter 62-701 FAC). These facilities have more strict design parameters and require contact water to be treated as leachate.

Any composting facilities receiving solid waste such as food waste that are not exempt from permitting are regulated under Chapter 62-709, which defines the permits required and the criteria necessary for design and operation of these facilities, the testing and reporting, the classification of composted material and the criteria for the end-use of compost (if applicable to the technology). The permit application must meet the requirements specified in Chapter 62-701.320, F.A.C., except that Form 62-709.901(1) is used, Application for a Permit to Construct/Operate a Solid Waste Management Facility for the Production of Compost.

This regulation should be considered when implementing a food waste processing facility as it limits the end-use of composted material based on the components of the waste stream utilized to generate the compostable material, for example pre-consumer versus post-consumer, and the heavy metals content. If the goal is to maximize the beneficial end-use of the composted material, then proper source separation and collection to prevent contamination will be critically important. Table 1 provides a summary of the compostable material type, description, and end-use criteria.

Table 1. Compostable Material Classification, Description, and End-Use Criteria from FAC 62-709 Criteria for Organics Processing and Recycling Facilities

Compost Classification[1]	Description[1]	End-Use Criteria[2]
Type Y	Compost made only from yard trash, which is mature or semi-mature, and is fine, medium or coarse. For such compost, a foreign matter content of less than 2% and a metal concentration equivalent to code 13 is assumed.	Unrestricted distribution.
Type YM	Compost made from only vegetative waste, animal byproducts or manure, with or without yard trash, which is mature or semi-mature and is fine, medium or coarse. For such compost, a foreign matter content of less than 2% and a metal concentration equivalent to code 13 is assumed.	Unrestricted distribution.
Type A	Compost made from solid waste, other than only yard trash, vegetative waste, animal byproducts or manure, which is mature and is fine. The foreign matter content shall be less than or equal to 2%, and the metal concentration shall fall under code 13. Further, it shall contain no foreign matter, such as glass or metal shards, of a size and shape that can cause injury.	Unrestricted distribution.
Type B	Compost made from solid waste, other than only yard trash, vegetative waste, animal byproducts or manure, which is mature or semi-mature and is fine or medium. The foreign matter content shall be less than or equal to 4%, and the metal concentration shall fall under codes 13 or 24. Further, it shall contain no foreign matter, such as glass or metal shards, of a size and shape that can cause injury.	Compost classified as Types B shall be restricted to use by commercial, agricultural, institutional or governmental operations. If contact with the general public is likely (public park) Type B may be used in these locations.

Compost Classification[1]	Description[1]	End-Use Criteria[2]
Type C	Compost made from solid waste, other than only yard trash, vegetative waste, animal byproducts or manure, which is mature or semi-mature and is fine, medium or coarse. The foreign matter content shall be less than or equal to 10%, and the metal concentration shall fall under codes 13, 24 or 35.	Compost classified as Type C shall be restricted to use by commercial, agricultural, institutional or governmental operations. However, it cannot be used if contact with the general public is likely (public park).
Type D	Compost made from solid waste, or from only yard trash, vegetative waste, animal byproducts or manure, which is fresh and is fine, medium or coarse. It shall have a foreign matter content of less than or equal to 10%, and the metal concentration shall fall under codes 13, 24 or 35. Foreign matter content and metal concentration is assumed for fresh compost made from only yard trash, vegetative waste, animal byproducts or manure.	Compost classified as Type D shall only be used at landfills or land reclamation projects. However, such use shall not be allowed if contact with the general public is likely.
Type E	Compost made from solid waste, other than only yard trash, vegetative waste, animal byproducts or manure, which has a metal concentration that falls under code 46.	Type E must be disposed of pursuant to Chapter 62-701, F.A.C., unless demonstrated that use of this material will not endanger the public or the environment.

Notes:

1 62-709.550 Classification of Compost (2).

2 62-709.600 Criteria for the Use of Compost.

3 Code 1 Heavy Metal Concentrations: Cadmium ≤ 15, Copper≤ 450, Lead ≤ 500, Nickel ≤ 50, Zinc ≤ 900

4 Code 2 Heavy Metal Concentrations: Cadmium 15 ≤ 30, Copper 450 ≤ 900, Lead 500 ≤ 1,000, Nickel 50 ≤ 100, Zinc 900 ≤ 1,800

5 Code 3 Heavy Metal Concentrations: Cadmium 30 – 100, Copper 900 – 3,000, Lead 1,000 – 1,500, Nickel 100 – 500, Zinc 1,800 – 10,000

6 Code 4 Heavy Metal Concentrations: Cadmium ≥ 100, Copper ≥ 3,000, Lead ≥ 1,500, Nickel ≥ 500, Zinc ≥ 10,000

As food waste is regulated as solid waste, collectors and processing facilities that exceed exemption criteria or otherwise meet the requirements of Chapter 62-709 must be permitted by the FDEP under solid waste rules.

It should be noted that the FDEP is considering options to revise Chapter 62-709, which was first enacted in 2010 and has not been revised. Some of the key provisions being considered include revising definitions, design criteria for Permitted Facilities, storage, best management practices, compost quality, amongst other provisions.

3.2.3 Chapter 62-730, F.A.C. Hazardous Waste

Chapter 62-730, F.A.C. includes certain portions of the federal regulations (Title 40 CFR) related to hazardous waste adopted by reference by the State of Florida. The State hazardous waste rules establish standards for generators and transporters of hazardous waste as well as standards for owners and operators of hazardous waste treatment, storage, and disposal facilities.

Hazardous waste generators are classified into the following categories based on the quantity of hazardous waste generated per month:

1. Very Small Quantity Generators (VSQGs): Generate less than 220 pounds of hazardous waste per month and less than 2.2 pounds or more of acute hazardous waste per month.

2. Small Quantity Generators (SQGs): Generate 220 to 2,200 pounds of hazardous waste per month.

3. Large Quantity Generators (LQGs): Generate 2,200 pounds or more of hazardous waste per month or 2.2 pounds or more of acute hazardous waste per month.

The requirements and procedures for the construction, operation, modification, and closure of hazardous waste facilities are specified in Chapter 62-730, F.A.C. Operation permits are typically issued for a duration of five (5) years, and the term of a post-closure permit and a corrective action permit is generally 10 years.

3.2.3.1 Lithium-ion Batteries

As mentioned in Section 2.1.1.1.1, management of spent lithium-ion batteries has become a significant concern. Per the EPA, most lithium-ion batteries on the market are likely to meet the definition of hazardous waste under RCRA. Florida Statues (Chapter 403.7192, F.S.[24]) requires that a unit management system be implemented by manufacturers and marketers of rechargeable batteries and rechargeable battery-powered products sold in Florida. A unit management system refers to a collection and management program for discarded batteries in accordance with Section 403.7192. Rechargeable batteries including lithium-ion batteries need to be recycled or transported to a permitted disposal facility. In Florida, such batteries can be sent to a permitted Household Hazardous Waste facility.

Lithium batteries must also conform to applicable Hazardous Materials Regulations (HMR) requirement referenced in 49 CFR Parts 171-180 as lithium batteries that are transported for

[24] Florida Statute 403.7192

recycling, are regulated as a hazardous material by the Department of Transportation (DOT)[25]. If the lithium batteries get damaged or the terminal ends touch, it could lead to a fire and therefore, FDEP recommends placing a non-conductive tape over the terminals. FDEP website also provides information regarding battery safety, recycling and disposal, which is mentioned under "Take Charge Florida" campaign[26].

3.2.4 Chapter 62-212, F.A.C., Stationary Sources – Preconstruction Review

The federal Clean Air Act Amendments (CAAA) require the EPA to set National Ambient Air Quality Standards (NAAQS) for common pollutants emitted from numerous and diverse sources considered harmful to public health and the environment. There are currently NAAQS designated for six pollutants: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter (PM_{10} and $PM_{2.5}$). The CAAA also established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, young children, and the elderly. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings. Florida has incorporated the NAAQS by reference into the state's air quality regulations. The EPA tracks compliance with the NAAQS for each criteria pollutant by designating each area of the country as either "attainment" if the area meets the NAAQS or "nonattainment" if the area does not meet the NAAQS. A separate determination of attainment status is made for each criteria pollutant. Broward County is currently classified as an attainment area for all criteria pollutants.

Construction of new major sources (i.e., landfills, WTE facilities, etc.) and major modifications to existing major sources are subject to New Source Review (NSR) permitting requirements. NSR refers to the preconstruction review process that applies to new and modified major sources for the purpose of protecting air quality through a permitting framework that supports compliance with the NAAQS. NSR includes two permitting programs: Prevention of Significant Deterioration (PSD) permitting and Nonattainment NSR (NNSR) permitting. Under NSR, a new major source or a major modification proposed in Broward County would be subject to PSD permitting requirements in recognition that PSD review applies to new major sources in NAAQS attainment areas.

PSD permitting provides for carefully managed economic growth in a manner consistent with preserving clean air resources. The primary objectives of the PSD permitting program are to protect public health and welfare and to limit degradation of air quality in surrounding areas and within designated areas of special recreational, scenic, or historic value. The PSD permitting regulation requires that analyses be completed to address air pollution control technology requirements and to demonstrate that proposed projects will not adversely impact air quality.

In Florida, the permitting authority for issuance of air construction permits is the FDEP. Construction permits for projects subject to PSD permitting requirements are processed by FDEP's Division of Air Resource Management (DARM) office in Tallahassee. The PSD permitting regulation provides for public participation and input from the EPA and designated Federal Land Manager (FLM) for Class I areas and sensitive Class II areas in the vicinity of the project site. Input from these entities is given special consideration and concerns are typically required to be addressed by an applicant during the

[25] 49 CFR Chapter I Subchapter C, Parts 171-180. https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-C

[26] https://floridadep.gov/waste/waste-reduction/content/take-charge-florida

permit review process. As the permitting authority, FDEP makes the final decision on whether to issue or deny issuance of an air construction permit.

3.2.5 Chapter 62-213, F.A.C., Operation Permits for Major Sources of Air Pollution

In Florida, major sources of air pollutant emissions are subject to Title V operating permit program requirements under Chapter 62-213, F.A.C. Title V air operation permits specify applicable air quality requirements for affected sources including emission limitations, monitoring, testing, recordkeeping, and reporting obligations. Each Title V source in Florida is required to pay an annual emissions fee. Title V operation permits are effective for 5 years, and applications for permit renewal must be submitted to FDEP no later than 225 days before the permit expiration date. New facilities subject to the Title V permitting program must file operation permit applications with FDEP at least 90 days before the facility's air construction permit expires, but no later than 180 days after operations commencement. Prior to final permit issuance, the Title V permitting process requires a public notice period and review by EPA.

3.2.6 Chapter 62-296, F.A.C., Stationary Sources – Emission Standards

Standards for mercury emissions applicable to waste-to-energy facilities in Florida are specified in Section 296.416 of this chapter. These standards apply to waste-to-energy facilities with charging rates of 40 tons per day or more.

3.2.7 Florida Electrical Power Plant Siting Act

The intent of the Power Plant Siting Act (PPSA) is to establish a procedure for the selection and utilization of sites for electrical generating facilities, such as a waste-to-energy facility, while ensuring through reasonable methods that such facilities will pose minimal adverse impact to human health and the environment. PPSA is a centralized process for licensing large power plants in the State of Florida. The PPSA Certification is typically issued by the Siting Board and it addresses permitting, land use and zoning. PPSA Certification generally replaces local and state permits but does not include licenses required by the federal government.

PPSA is applicable to all steam or solar electrical generating facilities that generate over 75 megawatts of electricity. Statutory laws pertaining to Florida Electrical Power Plant Siting Act are specified in Sections 403.501-403.518, FS [27]. The procedures for reviewing and processing the electrical power plant applications are outlined in Sections 403.501 through 403.518, F.S., and Chapter 62-17, Parts I and II, F.A.C. The application process for a new facility including an application guide is provided on the FDEP website.

3.2.8 Chapter 403.706, F.S. Local Government Solid Waste Responsibilities

The State of Florida prescribes that "*The governing body of a county has the responsibility and power to provide for the operation of solid waste disposal facilities to meet the needs of all*

[27] 403.501-.518

incorporated and unincorporated areas of the county." The Florida Statutes do not specify how this responsibility is achieved. The State of Florida also delegates the power and authority to adopt ordinances governing the disposal of solid waste generated outside of the county at the county's solid waste disposal facility. Other key elements of this legislation[28] include that a county and/or municipality:

- Implement a recyclable materials recycling program to achieve a 75% recycling rate by December 31, 2020.
- Implement a program for recycling construction and demolition debris.
- Require the provision of adequate space and adequate receptacles for recycling at multifamily residential or commercial properties.
- Consider plans for composting or mulching organic materials that would otherwise be disposed of in a landfill. The composting or mulching plans are encouraged to address partnership with the private sector.
- Ensure, to the maximum extent possible, that municipalities within its boundaries participate in the preparation and implementation of recycling and solid waste management programs through interlocal agreements pursuant to s. 163.01 or other means provided by law.

3.2.9 Zero Waste Legislation

Legislation and programs addressing Zero Waste goals are typically pursued at a local level (county, city, or municipality), with many states such as California mandating diversion requirements at a state level but leaving much of the action towards those goals to local regulators. Examples of types of legislation or programs used to advance Zero Waste initiatives include but are not limited to:

- Material Bans – One more public-facing type of legislation is material bans. Typical items targeted by material bans include single-use plastics, plastic straws, polystyrene foam, and plastic bags. Bans such as these typically do not reduce waste-to-landfill by a substantial tonnage but are none-the-less impactful in reducing non-recyclable or non-compostable material from the waste stream. Florida state law currently prohibits local municipalities from banning plastic bags, but in time that law may be changed.
- Diversion or Zero Waste Mandates – State or local governments can set diversion or zero-waste mandates that require diversion at a set goal. This is most easily applied to lower tier government bodies that the higher-level governmental entity has jurisdiction over, such as a state mandate applied to counties, or a local government mandate applied to local governmental buildings. Those lower tier government bodies can then be held accountable for reaching the proposed goal(s) and can justify spending on studies, programs for residents and businesses, and facilities to reach those goal(s).

[28] http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0400-0499/0403/Sections/0403.706.html

- Extended Producer Responsibility (EPR) – EPR policies put the financial responsibility for a product's end-of-life on the producers of the product, rather than directly to ratepayers or taxpayers. EPR policies can be difficult to pass due to the complexities of designing the regulations and setting the rates on materials, as well as pushback from manufacturers. However, these policies can have a substantial impact by incentivizing manufacturers to minimize waste or design for recycling, as well as incentivize the recycling of waste materials by product users. An extremely successful example of EPR is deposit return schemes for beverage containers, which allow for a higher return rate for plastic bottles and aluminum cans than other recyclable materials.

- Public-Private Partnerships (PPP) – PPPs can be an impactful way to develop the infrastructure necessary to improve diversion, such as development of more up-to-date MRFs, anaerobic digestors, WTE facilities, transfer stations, or other facilities. Even if a mandate increases the diversion at the point of generation, the materials diverted will still need to have a facility where it will be processed and a market for the sale of the product.

- Contractor Performance Incentives – Contracts with operators can be designed so that financial incentives exist for better performance. For example, a high diverter, San Jose's contracts with waste haulers allow for tiered higher rates to be paid to the hauler by the local government for higher diversion rates, as well as incentives to minimize contamination as higher contamination requires the hauler to pay a higher rate to the recycling or organics processor. Another example of a performance incentive is payment-sharing for recyclables or compostable products sent to market, where operators are paid a portion of the sale value of the materials to incentivize higher quality and quantity of outputs.

- Pay-as-You-Throw (PAYT) – PAYT is a type of incentive structure that encourages waste generators such as residents or businesses to limit the amount of waste that they set out. PAYT programs often either charge households by the size of bin that is used, or by the sale of certified bags for pickup.

- Product Certification – A concept being explored by some municipalities is adhering to a certification standard for products created by recycling or organics processors. For example, PAS 100 is a standard used the UK for compost. Another example is standards for biogas to be used as Renewable Natural Gas (RNG) in pipelines. These types of standards allow purchasers of these products produced from waste to know the quality of material that they are purchasing, thus encouraging a market for those products.

- Government Purchasing Programs – Local governments can enact policies and legislation related to procurement practices to assist in the development of secondary markets for certain recycled materials. Such policies may include requirements for minimum recycled content in new products, sourcing local mulch and compost from recycled yard waste and recovered clean wood, and others. If executed properly, these programs can effectively create the demand for recycled material and overcome one of the most difficult challenges to recycling.

3.2.10 Recycling Legislation

The State of Florida recycling goal is 75%. Per Florida Statute 403.706[29], all Florida counties must provide the opportunity for their residents to recycle. As mentioned in Section 403.706(2)(a), F.S., Florida counties and municipalities are encouraged to form cooperative arrangements for implementing recycling programs. Recyclable materials per FDEP's comprehensive recycling program as noted in Section 403.7032, F.S. include, but are not limited to, metals, paper, glass, plastic, textile, rubber materials, and mulch. Also, per Section 403.706, F.S., each county is required to implement a construction and demolition debris recycling program.

FDEP has established a Recycling Recognition Program to promote recycling and encourage private and public institutions, organizations, schools and businesses to increase recycling in order to reach the State's recycling goal by 2020. In order to receive recognition after 2020, a recycling rate of at least 75% is required. Per Chapter 403, F.S., solid waste that is used for the production of renewable energy counts toward the State's long-term recycling goal[30] and the Florida Renewable Energy Policy[31] as described in Section 366.92, F.S. promotes the development of renewable energy in the State of Florida. In accordance with these Florida Statues, renewable energy credits for solid waste processed at any waste-to-energy facility or resource recovery facility within Broward County can be included as recycled materials under the Recycling Recognition Program. Also, renewable energy recycling credit for solid waste that is disposed in a landfill, which has a landfill gas collection system with beneficial use of the collected landfill gas, can be included as materials recycled. According to FDEP 2023 recycling credits data, Broward County ranked 18th among Florida counties, achieving a traditional recycling rate of 30% and an overall recycling rate of 39%.

Effective 2010, the Recycling Business Assistance Center (RBAC) was created by the FDEP with the intent that this center would assist in the development and expansion of markets for recyclable materials to achieve the 75% recycling goal. The main objectives of RBAC are:

1. Provide guidance to increase recycling markets
2. Create connections between industry and government professionals
3. Increase awareness of RBAC's services

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[29] http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0400-0499/0403/Sections/0403.706.html

[30] Section 403.706(4)(a), F.S., states: "*In order to promote the production of renewable energy from solid waste, each megawatt-hour produced by a renewable energy facility using solid waste as a fuel shall count as 1 ton of recycled material and shall be applied toward meeting the recycling goals set forth in this section. If a county creating renewable energy from solid waste implements and maintains a program to recycle at least 50 percent of municipal solid waste by a means other than creating renewable energy, that county shall count 1.25 tons of recycled material for each megawatt-hour produced. If waste originates from a county other than the county in which the renewable energy facility resides, the originating county shall receive such recycling credit.*"

Section 403.706(4)(b), F.S.: "*A county may receive credit for one-half of the recycling goal set forth in subsection (2) from the use of yard trash, or other clean wood waste or paper waste, in innovative programs including, but not limited to, programs that produce alternative clean-burning fuels such as ethanol or that provide for the conversion of yard trash or other clean wood waste or paper waste to clean-burning fuel for the production of energy for use at facilities other than a waste-to-energy facility as defined in s. 403.7061.*"

[31] Florida Renewable Energy Policy Section 366.92(1), F.S.: "*It is the intent of the Legislature to promote the development of renewable energy; protect the economic viability of Florida's existing renewable energy facilities; diversify the types of fuel used to generate electricity in Florida; lessen Florida's dependence on natural gas and fuel oil for the production of electricity; minimize the volatility of fuel costs; encourage investment within the state; improve environmental conditions; and, at the same time, minimize the costs of power supply to electric utilities and their customers.*" (Chapter 366 Section 92 - 2024 Florida Statutes - The Florida Senate (flsenate.gov))

https://floridadep.gov/waste/waste-reduction/content/florida-recycling-statutes-and-rules

It should be also noted that solid waste and recycling related bills are routinely introduced for consideration by the Florida Legislature, but are not adopted. The most notable example from 2023 is HB 455/SB 36: Comprehensive Waste Reduction and Recycling Plan, which would require the FDEP to develop a comprehensive waste reduction and recycling plan for the state by July 2025 that includes recycling goals based on sustainable materials management and waste diversion; a 30-year plan to implement strategies relating to recycling education and outreach; provide local government recycling assistance; and recycling include materials market development. Other bills with pre-emption initiatives are discussed in Section 3.2.10.1 below.

3.2.10.1 State of Florida Pre-Emptions

The State of Florida, through Chapter 403, Section 708, F.S., pre-empts local government from regulating the packaging of products manufactured or sold in the state by regulation or ordinance adopted after March 1, 1974. This has been legally defended to include single-use plastic containers and bags.

As noted in Section 3.2.10, solid waste and recycling related bills are routinely introduced for consideration by the Florida Legislature, but are not adopted. A notable example is SB 498, Preemption of Recyclable and Polystyrene Materials that would have removed the pre-emption of local laws regarding the regulation of auxiliary containers, wrappings, or disposable plastic bags. Another is SB 698: Regulation of Single-Use Plastic Products, which would have authorized coastal communities to establish pilot programs to regulate single-use plastic products.

There are other pre-emption initiatives that failed that could have adversely impacted the Authority. One example is HB 975/SB 798, Solid Waste Management, which would have prohibited counties and municipalities from "unreasonably restraining" private entities from providing solid waste management services within the local government's jurisdiction and would have also sunsetted all active commercial solid waste franchise agreements at the conclusion of their current contract and prohibited exclusive renewals. Another is SB 1126, Regulation of Auxiliary Containers, that would have expressly preempted local governments from regulating certain single-use bags, cups, bottles, or other packaging.

However, while Chapter 403, Section 708 pre-empts local governments from regulating the packaging of products manufactured or sold in the state, it does not appear to prevent local governments from banning the disposal of materials. Such bans can improve the recycling rates for materials such as single-use plastics and other specifically targeted materials, but must be properly planned and implemented with sufficient collection, processing, and secondary market infrastructure to manage the potential volume of materials in the waste stream.

3.2.11 Organic Waste Legislation

The US Composting Council reported that as of 2023, 21 states had landfill bans in place for yard waste, many dating back to the 1990s.The five states with the largest number of yard waste composting facilities (Ohio, Wisconsin, Florida, New Hampshire and South Dakota) also have yard waste landfill disposal bans. Regarding food waste, as of 2024 five states (California, Connecticut, Massachusetts, Rhode Island and Vermont) have established food waste disposal bans, and predictably, those states have the majority of commercial-scale (greater than 2,000 tons per year) organic waste processing facilities. Four other states have enacted organics diversion requirements.

Many cities (i.e., Phoenix, Arizona; Austin, Texas; and others) have also adopted regulations regarding the management of food/organic wastes within their jurisdictions.

California's Senate Bill 1383 (SB 1383) is the most significant state-level organic waste legislation adopted to date in the United States, mandating residences and businesses to sort and separately collect food scraps, food-soiled paper and yard debris from trash and recycling and subscribe to an organic waste collection service. The law also requires that all jurisdictions (cities, counties, and special districts that provide solid waste collection services) provide food/organic waste collections services to all residents and businesses and recycle the collected organic waste by January 1, 2022. As a result, SB 1383 has greatly accelerated the growth of organic waste programs, in California, with 465 of 616, or 75% of jurisdictions having organic waste, including food waste, collection programs in place (Calrecycle.ca.gov).

In the State of Florida, food waste is regulated as solid waste. The State of Florida continues to manage food waste from the viewpoint of protecting public health and safety by minimizing disease vectors and regulates food waste, with some exceptions, as solid waste that must be managed in a permitted solid waste facility. Consequently, there has been no significant development of municipal-scale food waste diversion programs to date in Florida.

Mandatory food waste diversion or processing could be enacted by the State of Florida or by a local government, via statute, local ordinance, or special act, by banning food waste disposal via landfill and/or WTE or requiring source separation and processing for commercial and/or residential properties. The State of Florida has not enacted a landfill and/or WTE disposal ban for food waste or mandatory source separation. However, local governments in several communities within Florida, other states and municipalities across the U.S. have implemented such ordinances. For example, in June 2023, the City of Gainesville, Florida (Ordinance 200381) enacted mandatory food waste source separation and composting for commercial businesses that generate one cubic yard of food waste or more per week and is currently in the process of enacting mandatory source separation, curbside collection and composting of organic food waste for residents.

3.3 LOCAL REGULATIONS

The SCS Team conducted a review of local legislation applicable to Broward County and its municipalities for regulating and managing municipal solid waste and recycling programs. Local ordinances, rules and regulation data are discussed below.

3.3.1 Municipal Solid Waste Ordinances, Resolutions and Rules

3.3.1.1 Chapter 27, Article VI – Solid Waste

Rules for regulation and management of solid waste activities and facilities within the geographic boundaries of Broward County is specified in Chapter 27, Article VI of Broward County Code of Ordinances (Code), with the intent of protecting the County's natural resources and the health, safety and wellbeing of its residents. As noted in Chapter 27, Article VI, Section 27-211 of the Code[32], the Resilient Environment Department ("RED") is responsible for enforcing the provisions of Article VI, Solid Waste. General prohibitions regarding storage, processing, and disposal of solid waste are

[32] https://library.municode.com/fl/broward_county/codes/code_of_ordinances?nodeId=PTIICOOR_CH27POCO_ARTVISOWA

provided in Chapter 27, Article VI, Section 27-215 of the Code. Recycling and recovery of resources with potential further use, that would otherwise end up in the disposal stream, are encouraged.

Prior to construction, operation and/or modification of any solid waste management facility, a solid waste management license must be obtained per Chapter 27, Article VI, Section 27-216 of the Code, which is authorized by RED. Activities or facilities that are exempted from the licensing requirement as stated in Section 27-216(a)(2), are:

> *"(2) Unless otherwise prohibited by the Code, the following activities or facilities are exempted from the licensing requirement provided that no nuisance or any condition is created that adversely affects the environment or public health and provided that the activity or facility does not violate any provisions of the Code, or federal, state, or local government regulations:*
>
> *a) Backyard composting;*
>
> *b) The on-site storage, processing, disposal, and open burning of solid waste from normal, on-site farming activities;*
>
> *c) The storage of solid waste in containers on property which is owned, rented or leased by the persons who generated the stored waste from their own on-site activities;*
>
> *d) Facilities authorized by a site certification issued under Chapter 403, pt. II, F.S. (§ 403.501, F.S. et seq.), Electrical Power Plant Siting;*
>
> e) *The on-site temporary storage of construction and demolition debris, provided that the debris is generated from on-site activities."*

Section 27-216 also specifies the license requirements and standards for solid waste management activities such as borrow pit reclamation utilizing clean debris as fill material, landfills (Class I, Class II & Class III), material recovery area or transfer station, compost area, waste tire processing or waste tire collection area, and construction and demolition debris disposal area. The owner or operator of licensed solid waste management facilities must submit to RED applicable compliance, testing and monitoring reports to ensure compliance. In addition, records, reports, analytical results as required by the Code need to be maintained onsite and made available to RED for review upon request.

3.3.1.2 Chapter 14 – Garbage and Trash

The purpose of Broward County Code of Ordinance, Chapter 14[33] is to regulate the disposal of processible waste in an environmentally safe, efficient, and feasible way in order to conserve Broward County's limited landfill space. Landfilling of any processible waste in excess of 1,000 tons per day is prohibited per Section 14-2 as long as there is capacity available to accept and dispose such waste at any operating resource recovery/WTE facilities in Broward County.

The County's Mandatory Residential Recycling Ordinance is set forth in Sections 14-71 through 14-75 of the Code and is applicable only within the unincorporated areas of Broward County. Per the Broward County Recycling Program, recyclable materials including newspaper, glass, plastic, aluminum cans and steel are required to be source separated and collected by a hauler. Haulers are

[33] https://library.municode.com/fl/broward_county/codes/code_of_ordinances?nodeId=PTIICOOR_CH14GATR

required to submit monthly reports to Broward County Waste and recycling Services specifying the tonnages and number of units served.

3.3.2 Broward County Recycling Programs

Various municipalities in the U.S. as well as in the State of Florida have enacted mandatory recycling ordinances, resolutions and rules. Table 2 below provides a summary of recycling programs for each of the 28 participating municipalities within Broward County.

Table 2. Recycling Programs in Broward County

Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Coconut Creek[34] [35] [36] [37]	Y (Collection & Drop off)	Y (Collection & Drop off)	Y (Collection & Drop off)	Y	Y	N	N
Cooper City[38] [39] [40]	Y (Collection)	Y (Collection)	Y (Open Market)	Y	N	N	Y (Mandatory for Residents)

[34] Coconut Creek, FL Code of Ordinances, Article III Sec. 12-61. " All commercial properties that engage in recycling recovered materials in the city shall register yearly with the city on a form provided by the city by October 1, of each year, and pay a yearly registration fee of one hundred dollars ($100.00) for each service location in the city". https://library.municode.com/fl/coconut_creek/codes/code_of_ordinances?nodeId=PTIICOOR_CH12GARE_ARTIIIREWA_S12-61ALCORE.

[35] Republic Services of Florida Solid Waste Agreement pg. 16 7.3.2 and pg. 19 7.7.3 states residential single and multi-family recycling collection. "The Contractor shall collect all of the Source Separated Recyclable Material that each Residential Curbside Customer Sets Out in Recycling Carts ""The Contractor shall provide Recycling Carts or Mechanical Containers for the Collection of the Customer's Source Separated Recyclable Materials"

[36] Coconut Creek City Website states drop-off recycling; Drop-off recycling Recycling Drop-Off Center Leaderboard | Public Works (coconutcreek.net)

[37] Tamarac City Website "The City of Tamarac, in participation with the cities of Coconut Creek, Coral Springs, Fort Lauderdale, Lauderdale-by-the-Sea, Lauderdale Lakes, and Pompano Beach, provides a series of drop-off events for household hazardous waste (HHW) and old electronics (E-Waste)".Hazardous Waste | Tamarac, FL - Official Website

[38] Cooper City, Fl, Code of Ordinance, Article I Sec 14-3 "All owners and occupants of residential and multi-family units in the City shall participate in the City's residential and multi-family units recycling program, by participating in the placement and segregation of recyclable materials for collection, "https://library.municode.com/fl/cooper_city/codes/code_of_ordinances?nodeId=CH14RESEGO_ARTIRE_S14-3MAPA

[39] Coastal Waste & Recycling Agreement pg. 51 Sec 5.1.2." Commercial recycling services will be open market and will not be part of this exclusive agreement"

[40] Wheelabrator Solid Waste Agreement pg. A-2 states that the agreement includes the recycling of household electronic such as computers televisions, printers, DVD players, copiers and cell phones.

Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Coral Springs[37] [41] [42] [43] [44]	Y (Collection & Drop off)	Y (Collection & Drop off)	Y (Collection & Drop off)	Y	Y	Y	N
Dania Beach [45] [46]	Y (Collection)	Y (Collection)	N	Y	Y	N	N
Davie[42] [47]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	Y

[41] Coral Springs, FL Code of Ordinances, Article I Sec. 8-3. "Every property owner, tenant, resident, firm or corporation shall use the services of contractor for the collection of recyclable materials upon the approval, the resolution, of the recycling program by the city, and it shall be the responsibility of the owner to pay for such service. Such compulsory service shall include a minimum of one (1) pickup per week. It is not the intent of this section to prohibit any nonprofit organization from soliciting recyclable materials for the purpose of resource recovery and recycling" https://library.municode.com/fl/coral_springs/codes/code_of_ordinances?nodeId=PTIICO_CH8PRMA_ARTIGACORESE_S8-3COGASE

[42] Coastal Waste and Recycling of Florida, Inc. Solid Waste Agreement Sec 7.13 "The Contractor shall provide Supplemental Collection Service for Commercial Customers, subject to the requirements herein. Specifically, the Contractor shall provide Collection Service for Bulky Waste, Yard Waste, and Source Separated Recyclable Materials when such service is requested by a Commercial Customer."

[43] "The City of Coral Springs offers curbside and drop-off recycling and waste disposal services. The Recycle Right Coral Springs program aims to manage and conserve resources sustainably through proper recycling, safe hazardous waste disposal, and waste reduction." https://www.coralsprings.gov/Government/Departments/Public-Works/Garbage-Recycling/Recycling#:~:text=The%20City%20of%20Coral%20Springs%20offers%20curbside%20and%20drop-off%20recycling

[44] The City of Coral of Springs offers free drop-off food waste disposal services for residents. https://www.coralsprings.gov/Government/Departments/Public-Works/Garbage-Recycling/Composting

[45] Dania Beach, FL Code of Ordinances, Article IV Sec. 13-69. "Recyclables. For each residential unit(s) and multi residential family building(s) containing no more than four (4) units, the city shall provide once a week pickup of recyclables, which shall be placed in recycling bins provided by the city. The pickup of recyclables shall be on one of the days that solid waste is picked up and the residents or occupants shall not co-mingle solid waste with recyclables."
https://library.municode.com/fl/dania_beach/codes/code_of_ordinances?nodeId=PTIICOOR_CH13HESA_ARTIVGATR_S13-69SEPRCI

[46] One of the Cities that have Participation Agreements with Broward County for the disposal of household hazardous waste and electronic.
https://www.broward.org/WasteAndRecycling/Recycling/Pages/ElectronicsRecycling.aspx

[47] Davie Beach, FL Code of Ordinances, Article V Sec. 9-77. "it shall be required by residential, commercial, industrial, office and all other waste producers of the town, as designated by resolution, to separate the recyclable materials from waste and place materials in the appropriate recycling container on a date as designated."
https://library.municode.com/fl/davie/codes/code_of_ordinances?nodeId=PTIICOOR_CH9GARE_ARTVCOREWA_S9-77RECO

Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Deerfield Beach[48] [49] [50]	Y (Drop off)	Y (Drop off)	Y (Drop off)	N	N	Y	Y
Fort Lauderdale[37] [51] [52]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	N
Hillsboro Beach[53]	Y (Collection)	Y (Collection)	No Information Available	Y (Drop off)	No Information Available	No Information Available	N

[48] Deerfield Beach, FL Code of Ordinances, Article IIII Sec 106, 107, 108. "Residents' responsibilities. It is the responsibility of all residents to separate recyclable materials from all residential solid waste. All recyclables as identified herein shall be placed at the curbside along with solid materials on the resident's designated collection days in bins or other solid containers provided by the city." *Multi-family residential communities' responsibilities.* It is the responsibility of all multi-family communities' residents to separate recyclable materials from all residential solid waste. It shall be required that all multi-family residential communities' management offices to provide recycling services for all residents. Recyclables for collection shall be placed at the designated recycling collection location in carts or other solid containers provided by the city." Commercial operations accounts' responsibilities. It is the responsibility of all commercial establishments to separate recyclable materials from all solid waste materials. Recyclables for collection shall be placed at the designated recycling collection location in carts or other solid containers provided by the city." https://library.municode.com/fl/deerfield_beach/codes/code_of_ordinances?nodeId=PTIICOOR_CH58SOWA_ARTIIIREWA_S58-106SIMICURERE REWA

[49] " The City Commission voted to suspend the City's curbside recycling collection programs starting July 1, 2020. The suspension is currently in place. Although curbside recycling has been suspended, you can bring your clean and uncontaminated recyclables to the City's Recycling Drop-Off Center. https://deerfield-beach.com/1723/Recycling#:~:text=The%20City%20of%20Deerfield%20Beach%20Recycling%20Drop-Off%20Center%20makes%20it.

[50] The City of Deerfield Beach offers drop-off food waste disposal services for residents (for composting). https://www.deerfield-beach.com/235/Drop-Off-Center

[51] Fort Lauderdale, FL Code of Ordinances, Article I Sec 24-8, 24-26." The owner of each multifamily residence shall implement a recycling program and encourage the participation of each living unit in such multifamily residence." "Residential Recyclables shall be collected roadside once weekly or as scheduled by the city." https://library.municode.com/fl/fort_lauderdale/codes/code_of_ordinances?nodeId=COOR_CH24SOWA_ARTIIMUCODISE_DIV1GE_S24-26FRPRGE

[52] City of Fort Lauderdale Website "Commercial recycling is voluntary in Fort Lauderdale, meaning that at this time there is no ordinance in place requiring businesses to contract with a recycling hauler." https://gyr.fortlauderdale.gov/greener-government/recycling-waste-reduction/recycling-in-fort-lauderdale/commercial-recycling#:~:text=Reducing%20waste%20by%20recycling%20is%20a%20great%20way%20to%20improve

[53] Town of Hillsboro Beach Website. Recycling is collected one time weekly and electronic recycling can be dropped off. https://www.townofhillsborobeach.com/295/RecyclingSolid-Waste-Information#:~:text=Recycle%20Electronics.%20Household%20Hazardous%20Waste.%201210%20Hillsboro%20Mile%20|%20Hillsboro

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Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Hollywood[46] [54]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	Y
Lauderdale Lakes [37] [55] [56]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	N
Lauderdale-by-the-Sea [33] [57]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	N
Lauderhill [462] [58]	Y (Collection)	Y (Collection)	N	Y	Y	N	Y (Residents Only)

[54] City of Hollywood, FL Code of Ordinances, Article V Sec 50.04. "Single-family, duplex and triplex owners, renters, and occupants of these units, the city shall provide a curbside recycling bin for the purpose of recycling. "All new and existing multi-family unit owners, landlords, agents, and associations shall be responsible for implementing an on-site recycling program which must be source separated for each of their multi-family units no later than October 1, 2015, unless otherwise noted and excepted." "All new and existing commercial establishments shall implement an on-site recycling program which must be source separated no later than October 1, 2015, unless otherwise noted and excepted. However, commercial establishments that are on minimal waste service of one or fewer waste pickups per month, are exempt from providing an on-site recycling program." https://codelibrary.amlegal.com/codes/hollywood/latest/hollywood_fl/0-0-0-37297

[55] Lauderdale Lakes, FL Code of Ordinances, Article II Sec 16. "Single Family: Collection shall be made from all single-family homes ("Units") located in the City. Contractor shall collect properly set-out program recyclables acceptable at the designated Broward County MRF pursuant to the Agreement for Materials Recycling Facility between Broward County and Waste Management Inc. of Florida applicable to cities that are members of the Interlocal Agreement." "Multi-Family: Collection shall also include multi-family residences for such program recyclables set forth above." https://library.municode.com/fl/lauderdale_lakes/codes/code_of_ordinances?nodeId=APXAFR_ARTIISOWACOFR_DIV4WAMAINFL_S16REPRSCSE

[56] City of Lauderdale Lakes Website. "The City of Lauderdale Lakes provides garbage, bulk waste and recycling services to the residential and commercial residents of the City through an exclusive franchise agreement with Waste Management." -https://www.lauderdalelakes.org/156/Garbage-and-Bulk-Waste-Collection#:~:text=The%20City%20of%20Lauderdale%20Lakes%20provides%20garbage,%20bulk%20waste%20and

[57] Solid Waste Agreement Waste PRO Pg.17 Sec 3.4. "The CONTRACTOR shall offer recycling services to all Commercial Recycling Collection Service Units; the fees for those services shall be agreed upon by the Commercial Recycling Collection Service Unit and the CONTRACTOR". "The CONTRACTOR shall provide Recycling Services to all Residential Service Units."

[58] Lauderhill, FL Code of Ordinances, Article II Sec 10-20. "The recyclable waste services for single family and multifamily as set forth in this section shall not be optional, but shall be required of all residents to the extent as set forth herein" https://library.municode.com/fl/lauderhill/codes/code_of_ordinances?nodeId=CH10GATRUNUNCOABREPR_ARTIIREWA_S10-20REPR

Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Lazy Lake [462] [59]	Y (Collection)	Y (Collection)	No Information Available	Y	Y	N	N
Lighthouse Point [462] [60] [61]	Y (Collection)	Y (Collection)	Y (Open Market)	Y	Y	N	Y (Mandatory for Residents)
Margate [462] [62]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	Y (Mandatory)

[59] Solid Waste Agreement with Coastal Waste & Recycling of Florida states residential recycling curbside pickup.

[60] Lighthouse Point, FL Code of Ordinances, Div 1 Sec 74-38. "All persons living in residential living units located on properties zoned RS-3, RS-5, RD-10, RM-16 and RM-25 shall participate in and pay for the costs of participating in the curbside recyclable materials and collection and recovery services in the city, the costs thereof as established by agreement between the city and a duly authorized recycling collection contractor." https://library.municode.com/fl/lighthouse_point/codes/code_of_ordinances?nodeId=PTIICICO_CH74SOWA_ARTIICODI_DIV1GE_S74-38REPR

[61] Municipal solid waste (MSW) and recyclable materials collection services agreement between the City of Lighthouse Point and Waste Management Inc. of Florida. Pg 2. "Collection services shall include but may not be limited to automated collection of residential garbage carts, automated collection of residential recycling carts, multi-family garbage and recycling services, commercial garbage services, bulk trash and white goods collection, and Permanent Rolloff services. " "Commercial recycling services and temporary rolloff services will be open market and will not be part of this exclusive agreement"

[62] Margrate, FL Code of Ordinances, Chap 19 sec 19-10, 19-11. "All single-family dwelling units shall receive collection service from the city's contractor for source separated recyclable materials once per week on one (1) of the scheduled garbage collection days." All multifamily communities shall receive collection service from the city's contractor for source separated recyclable materials at least once per week." "Every owner or tenant of a commercial establishment shall use the services of the contractor, and it shall be the responsibility of the owner to pay for such services." https://library.municode.com/fl/margate/codes/code_of_ordinances?nodeId=PTIICOOR_CH19SOWARECOPRDI_S19-10COSOSEREMA

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Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Miramar [63][64]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	Y
North Lauderdale [46][65]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	Y (Residents Only)
Oakland Park [46][66][67]	Y (Collection)	Y (Collection)	Y	Y	Y	N	N

[63] Miramar, FL Code of Ordinances, Article IV, Sec 19-76, 18-77 and 18-78. "Recyclable Materials shall be segregated from other waste and placed in Recycling. Bins and Roll Carts and shall be placed at curbside or in designated areas on collection days as scheduled by the city or as agreed upon with the Franchise Hauler." "Recyclables for Commercial Establishments or Multi-Family Residential Establishments (not using wheeled carts) shall be placed in a city approved container and stored in an enclosure or other acceptable location as approved for by the City." https://library.municode.com/fl/miramar/codes/code_of_ordinances?nodeId=SPAADRE_CH18SOWA_ARTIVREPR_S18-77RECOSIMIREUNMUMIUNUSREBICA

[64] Drop-off at Waste Pro Operating Facility - Accepts household chemicals and electronic waste from Miramar residents on the first Saturday of each month at no cost. https://www.miramarfl.gov/419/Recycling-in-Miramar#!rc-cpage=73409

[65] North Lauderdale, FL Code of Ordinances, Article I, Sec 54-14, 54-20. Newspaper, Clear glass and aluminum cans shall be segregated from all other solid waste material by all single-family homeowners and Multi family homeowners. "All businesses performing solid waste collection, disposal, and recycling services within the city shall pay the following franchise fee to the city for the privilege of conducting and operating solid waste collection, disposal, and recycling services." https://library.municode.com/fl/north_lauderdale/codes/code_of_ordinances?nodeId=PTIICOOR_CH54SOWA_ARTIINGE_S54-14REPR

[66] Oakland Park Website. "Household waste is collected twice a week, yard waste is collected once a week, and recycling is collected once a week." https://oaklandfl.gov/637/Solid-Waste-and-Recycling#:~:text=The%20Town%20contracts%20with%20Waste%20Management%20for%20solid%20waste%20collection

[67] Oakland Park, Fl, Code of Ordinance Article II sec 42-23. "The town shall charge the owner or occupant of a dwelling or commercial establishment the amounts as set by resolution of the town commission for solid waste collection/recycling service". https://library.municode.com/fl/oakland/codes/code_of_ordinances?nodeId=PTIICOOR_CH42HESA_ARTIIGATRWE_S42-23SECHLE

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Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Parkland [462] [68]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	Y (Mandatory for Commercial)
Pembroke Park [462] [69]	Y (Collection)	Y (Collection)	Y	Y	Y	N	Y (Residents Only)
Plantation [70] [71] [72] [73]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	N (Encouraged)

[68] Parkland, Fl, Code of Ordinance Article II sec 35 and Article III Sec 7-51. "Each owner, occupier, caretaker or tenant of a residential dwelling unit in the City of Parkland shall separate all designated recyclable materials from other refuse in accordance with the provisions of this section irrespective of whether or not said dwelling unit receives paid solid waste services." "multifamily customers using a separate recycling dumpster, corrugated cardboard shall be segregated from all other solid waste material and must be flattened and placed into a recycling dumpster." "Mandatory commercial recycling - It is determined by the city that it is appropriate to require that commercial establishments separate commercial material"

[69] Pembroke Park, Fl, Code of Ordinance Article VI sec 11-97. "All newspaper, aluminum and bi-metal beverage cans and glass food and beverage containers shall be segregated from all other solid waste material by residential refuse customers. Aluminum and bi-metal beverage cans and glass food and beverage containers shall be placed in household recycling containers provided by the Town and placed out for collection for pickup by the garbage and trash collector, or other designated collector of the Town." "Article VIII. - Provision of commercial source separated recovered materials recycling services". https://library.municode.com/fl/pembroke_park/codes/code_of_ordinances?nodeId=PTIICOOR_CH11GARE_ARTVIRE_S11-97PRMACO

[70] Plantation, Fl, Code of Ordinance Article I sec 11-97. "All Persons owing real property within Plantation shall have the responsibility to ensure the proper handling, collection, transportation, and disposal of all Solid Waste; Recovered Materials, Recyclable Materials, and Exempt Material that is generated, deposited, or located upon their property." https://library.municode.com/fl/pembroke_park/codes/code_of_ordinances?nodeId=PTIICOOR_CH11GARE_ARTVIRE

[71] Plantation City Website. "While recycling in the City of Plantation is not mandatory, the City strongly encourages residents to recycle any and all recyclable materials." https://www.plantation.org/government/departments/public-works/recycling-guidelines

[72] Waste Management Franchise Agreement pg. 31 - Sec 5.11. The contractor may offer and make available its recovered materials collection service to all commercial customers"

[73] Drop-off services provided for HHW and electronics. https://www.plantation.org/government/departments/public-works/hazardous-electronic-medical-waste

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Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Sea Ranch Lakes[46]	Y (Collection)	Y (Collection)	No Information Available	Y	Y	N	No Information Available
Southwest Ranches[74] [75]	Y (Collection)	Y (Collection)	No Information Available	Y	Y	N	Y (Residents Only)
Sunrise [76] [77] [78]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	N

[74] Southwest ranches, Fl, Code of Ordinance Article II sec 16-25, 16-26. "All unincorporated residential unit owners/Multifamily, lessees, and occupants shall be responsible for recycling the designated recyclable materials, by placing them in the recycling containers and placing them at the curb on designated recycling pickup days, as set forth in this article." https://library.municode.com/fl/southwest_ranches/codes/code_of_ordinances?nodeId=PTIICOOR_CH16SOWA_ARTIICODI_S16-25RERE

[75] South Ranch Website. "HOUSEHOLD HAZARDOUS WASTE (HHW) & ELECTRONICS RECYCLING Household Hazardous Waste (HHW) includes paint, batteries, tires and similar materials. Electronic Materials include computers, computer monitors, televisions, printers, scanners, and similar devices. Neither HHW nor Electronic Materials are collected as solid waste, recycling, or bulk trash." https://www.southwestranches.org/wp-content/uploads/2024/01/SWR_English-online_2024.pdf

[76] Sunrise Fl, Code of Ordinance Article II sec 12-12, 12-15. "Source separated recyclable materials shall be set out in a collection container. Source separated recyclable materials may be placed in the same collection container with solid waste."" If a commercial customer receives collection service from the contractor or any other person for the collection of source separated recyclable materials or recovered materials, the customer must place those materials in a separate cart or container (i.e., not the cart or container used for garbage and rubbish)".https://library.municode.com/fl/sunrise/codes/code_of_ordinances?nodeId=PTIICOSUA.GECO_CH12SOWA_S12-15PRCOCU

[77] Sunrise City Website. Electronic recycling. https://www.sunrisefl.gov/departments-services/sanitation/recycling#:~:text=Sunrise%20Recycling%20Drop-Off%20Facility:%20Single%20Stream%20(all%20in%20one)%20Recycling.

[78] Drop-off services provided for HHW and electronics. The City of Sunrise and the City of Plantation have partnered to provide residents with opportunities to safely dispose of household hazardous waste (HHW) and electronics. Drop-off events are held on Saturdays throughout the year, and are open exclusively to residents of Sunrise and Plantation free of charge and with proof of residency. https://www.sunrisefl.gov/departments-services/sanitation/household-hazardous-waste

Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Tamarac[79] [80]	Y (Collection)	Y (Collection)	Y (Open Market?)	Y	Y	N	Y
West Park[462] [81]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	No Information Available
Weston[462] [82]	Y (Collection)	Y (Collection)	Y (Collection)	Y	Y	N	N (Encouraged)

[79] Tamarac, Fl, Code of Ordinance Article II sec 19-25,19-30. "Penalties for the failure to comply with the recycling program after receipt of the notice to comply as provided in this Section, or for the unauthorized collection of recycling materials shall be a fine of not less than one hundred dollars ($100.00) nor more than five hundred dollars ($500.00), or imprisonment for a term not exceeding ninety (90) days or by both such fine and imprisonment. Each day shall constitute a separate offense." "Every owner, tenant, or resident of a residential service unit, including, but not limited to, single-family residences, duplexes, triplexes, and townhouse dwelling units, and multi-family service units shall use the services of the city's franchise solid waste and recovered materials hauler, and it shall be the responsibility of the owner to pay for such services. Such compulsory service shall include a minimum of two (2) pickups per week."" Every owner or tenant of a Commercial Service Unit shall use the services of the city's franchise solid waste hauler, and it shall be the responsibility of the owner to pay for such services. Such compulsory service shall include a minimum of two (2) pickups per week if waste includes solid waste as defined herein."

[80] The City of Tamarac, in participation with the cities of Coconut Creek, Coral Springs, Fort Lauderdale, Lauderdale-by-the-Sea, Lauderdale Lakes, and Pompano Beach, provides a series of drop-off events for household hazardous waste (HHW) and old electronics (E-Waste). Residents of Tamarac may dispose of HHW and E-Waste at drop-off events in each participating City. This program provides Tamarac residents with a responsible way to recycle or dispose of household hazardous waste (HHW) and old electronics (E-Waste). https://www.tamarac.org/429/Hazardous-Waste

[81] Waste PRO Solid Waste Agreement Sec 3.3 pg. 129 states residential Recycling Services and Pg 87 sec 3.3.7 states commercial recycling.

[82] Weston, Fl Code of Ordinance. 110.03 Recycling Program pg. 2 states single family, multifamily and commercial recycling. Code states that Multifamily and Commercial customers shall be responsible for implementing On-site Recycling.

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Municipalities	Residential Recycling Program	Multifamily Recycling	Commercial Recycling	Electronics Recycling	HHW Recycling	Green (Yard & Food) Waste Program	Mandatory Recycling (Y/N)
Wilton Manors[83] [84]	Y (Collection & Drop off)	Y (Curbside & Drop off)	Y (Curbside & Drop off)	Y	Y	N	Y (Residents Only)

[83] Wilton Manors Fl, Code of Ordinance Article II sec 16-21,16-22,16-23. "Mandatory recycling shall be required for all single-family and multifamily units and shall include the recovery of program recyclable materials using approved containers provided by the City." "Commercial recycling service for non-residential accounts may contract directly for collection services with a certified recovered materials dealer licensed by the City. Non-residential commercial accounts may elect to use recycling services provided by the City." "The City may provide a community recycling drop-off center which shall be available to residential and commercial accounts."
https://library.municode.com/fl/wilton_manors/codes/code_of_ordinances?nodeId=PTIICOOR_CH16SOWA_ARTIISOWASE_S16-22CORECO

[84] The City has contracted with Coastal Waste & Recycling for a special Door Step collection of household hazardous waste. https://www.wiltonmanors.gov/185/Hazardous-Waste-Disposal.

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3.3.3 Broward County Comprehensive Plan – Solid Waste Element

The main intent of the Solid Waste Element of Broward County Comprehensive Plan[85] is to provide a cost-effective and equitable solid waste disposal system emphasizing waste minimization and resource recovery while meeting all federal, state, and local environmental quality standards. The Solid Waste Element also addresses solid waste facilities and services correlated to future land use projections. The Solid Waste Element service area includes all of Broward County, i.e., 31 municipalities as well as unincorporated areas.

As stated in Section 6.1, Broward County is required to develop and implement a waste minimization strategy that includes source reduction, reuse, recycling, and recovery. Solid Waste Element Policy 6.1.1 has set a target of 5% reduction in MSW generation rate per capita to achieve a level of 1.80 tons per year by 2030. Per Solid Waste Element Policy 6.1.2, Broward County along with its municipalities are encouraged to promote and implement programs to achieve the state's 75% recycling goal (including net waste combusted) by 2030. In addition, Policy 6.1.3 encourages resource recovery and operation of resource recovery/WTE facilities.

Some of the key programs associated with the Resource Recovery System mentioned in the Solid Waste Element Support Document dated 2010 included Resource Recovery System Operations, Materials Recovery Facility, Ash Monofill, BIC Landfill, Household Hazardous Waste Program, Electronics Recycling Program, and Resource Recovery System Public Education. Also, the 2010 Solid Waste Element Support Document identified recycling and source reduction programs in Broward County such as waste prevention program, residential recycling, government recycling, commercial recycling, electronics recycling, household hazardous waste, paint recycling program, recycled glass beach nourishment project, mulching and composting, and outreach programs.

The Solid Waste Element document of the Broward County Comprehensive Plan was last updated more than a decade ago. However, revisions to the Solid Waste Element document are currently on hold and therefore, the previous version is still in use. Once updated, the Solid Waste Element document will need to be reviewed again to identify any changes from the previous version and potential impacts to solid waste processing, recycling and waste reduction programs that are currently in place.

3.3.4 Recycling Incentive Programs

Typically, incentive programs are operated and managed by a third party for a monthly fee per household paid by the municipality. The third party is responsible for marketing to residents and obtaining rewards/coupons from local businesses as rewards for customers based on their participation in recycling. If a resident is interested in joining the program, they typically sign up online.

Broward County has introduced recycling incentive programs that offer rewards or discounts to participating residents and businesses to encourage recycling. Waste Pro Rewards is one of the main recycling incentive programs currently operating within Broward County.

The State of Florida has also established a Recycling Loan Program that provides access to capital for the purchase of equipment and machinery to expand recycling capacity in Florida. Specifically, the program offers long-term fixed-rate loans at interest rates up to 2% below prime with a maximum

[85] https://www.broward.org/BrowardNext/Documents/CompPlanDocs/Solid-Waste-Element.pdf

loan amount of $200,000. The program is limited to for-profit small businesses that are either legally licensed and operating in Florida, creditworthy start-up companies or out-of-state firms considering expansions into Florida. Eligible recycling companies must have a net worth less than $6 million and have less than 100 employees.

In addition, the FDEP established a Green Lodging Program in 2004 that designates and recognizes lodging facilities that make a commitment to conserve and protect Florida's natural resources, based on areas of sustainable operations, including waste reduction, reuse, and recycling.

3.3.5 Pay As You Throw Program

Pay As You Throw (PAYT) programs provide an incentive to reduce waste disposal and increase recycling by charging residents based on the quantity (typically volume) of waste set out for collection. The only PAYT program within Broward County is in Plantation, which has one of the longest-running PAYT programs in the United States. The program uses three types of bags, a standard size bag, a kitchen size bag, and a recycling bag, each at a different cost. The City of Plantation has implemented the use of carts for multifamily and select communities.

The structure of PAYT programs can vary. The bag system used in Plantation can pose issues with recycling as bagged materials impact material recovery facility (MRF) operations. Other programs offer varying sizes of roll carts and/or stickers at varying rates. The City of Plantation reported that Plantation has one of the lowest recycling contamination rates in the County.

While PAYT programs have not caught on extensively in Florida, numerous sources report the effectiveness of these programs in increasing recycling, organics collection and source reduction, with a commensurate decrease in waste generation. Reported increases in recycling typically range from 30-90 percent and decreases in waste generation typically range from 25-50 percent. [86]

3.3.6 Broward County Solid Waste Disposal and Recyclable Materials Processing Authority

Historical Governance: In 1987, Broward County entered into an Interlocal Agreement (ILA) with 26 of 31 municipal cities within the County, which created a dependent Solid Waste Disposal District (Former District). The Former District allowed the County to guarantee waste quantities in order to obtain tax exempt financing, Industrial Development Revenue Bonds, for the construction of solid waste disposal facilities, including Wheelabrator North and South Broward, which created the Resource Recovery System (System) that provided a regional approach to managing the waste stream generated within Broward County.

In accordance with the ILA, the Former District was governed by the Board of County Commissioners with non-binding administrative council from the Resource Recovery Board (Board) for coordinating the transport and disposal of solid waste generated by ILA Cities and unincorporated Broward County. The five cities that did not execute the ILA (non-ILA Cities) were each responsible for the disposal and administration of their own solid waste. The ILA expired in 2013, leaving all parties individually responsible to administer contracts for the disposal of their solid waste streams, or enter into a new agreement under new conditions.

[86] Sources include: http://wastezero.com/success-stories/; http://www.p2pays.org/payt/main/casestudies.htm; https://archive.epa.gov/wastes/conserve/tools/payt/web/html/success.html

Interlocal Agreement Executed in 2023: In May 2023, Broward County entered into a new ILA with 28 of 31 municipal cities within the County, which created an independent legal entity, the "Solid Waste Disposal and Recyclable Materials Processing Authority of Broward County, Florida" (Authority). The purpose of the Authority is to "*develop and implement a long-term, environmentally sustainable, transparent, innovative, and economically efficient plan and approach to disposal, reduction, recycling, and reuse of waste generated in Broward County*."

As stated in Article 1 of the new ILA, the Authority's goals are as follows:

- *"encourage recycling, reduction, and reuse, in order to divert Authority Solid Waste (defined as garbage, rubbish, trash, refuse, or other discarded material resulting from the operation of residential, commercial, governmental, or institutional establishments in Broward County that would normally be collected, processed, and disposed of through a public or private solid waste management service) from landfills, seeking to ultimately reach zero waste,*

- *support regional solutions with other counties with priority being given to the needs and goals of the Parties,*

- *conduct comprehensive public education campaigns, and*

- *engage in and/or support research and development into disposal, reduction, recycling, reuse, and utilization of the latest technology to create a sustainable and resilient Authority Solid Waste disposal and Recyclable Materials (those materials that are capable of being recycled and that would otherwise be processed or disposed as Authority Solid Waste) processing system."*

The general powers of the Authority pursuant to the new ILA include establishment of rates, fees and other charges; Recyclable Materials and Recovered Materials facilities, processing, and programs; collection and transportation services; Authority Solid Waste disposal; issuance of bonds, commitment of System Waste[87] ; and regulatory flow control.

3.3.7 Zoning Considerations

Development of a solid waste management facility must adhere to local zoning and land use requirements. Setbacks and limitations of use for landfills and other solid waste disposal facilities are specified in Broward County Zoning Code[88] (Section 39-368(i)), which are as follows:

1) "*Landfills or other solid waste facilities, except trash transfer stations, shall require a minimum plot size of twenty (20) acres.*

2) *The maximum plot coverage of all main and accessory buildings shall be ten percent (10%) of the net area.*

[87] Defined as "*Authority Solid Waste, Recovered Materials, and Recyclable Materials, collectively, generated in any of the Parties' jurisdictions and/or from outside of Broward County and identified as acceptable waste to be accepted by the Authority in the Master Plan. This term does not include Hazardous Materials or any waste deemed unacceptable in the Master Plan.*"

[88] Chapter 39-Zoning. https://library.municode.com/fl/broward_county/codes/code_of_ordinances?nodeId=PTIICOOR_CH39ZO

3) *No disposal area within the plot shall be within two hundred (200) feet of any plot line.*

4) *No part of any resource recovery facility shall be within five hundred (500) feet of any plot line.*

5) *The maximum height of any landfill area shall be one hundred twenty-five (125) feet above the established grade.*

6) *Plots used for landfills or other solid waste facilities, except trash transfer stations, shall not be located within one thousand (1,000) feet of any residentially-zoned district except agricultural districts."*

In addition, Section 39-368(k) of Broward County Zoning Code states that the minimum plot size for Trash Transfer Stations is 10 acres and such facilities must be located 500 feet or more from residentially zoned districts.

In the A-6 Agricultural-Disposal District (Sections 39-457 through 39-464), solid waste disposal facilities such as sanitary landfill, incinerators, or resource recovery facilities are permitted, and the height of any buildings or structures in this zoning district, with the exception of landfill, must not exceed 200 feet. The maximum height of a landfill is 125 feet above the adjacent ground level. The minimum plot size for disposal of refuse (including garbage and animal waste) and resource recovery facilities is 20 acres, and setbacks from plot lines are 100 feet and 500 feet, respectively.

Broward County Zoning Ordinance, Section 39-464 states the following: "*Any plot utilized for a dump, sanitary landfill, incinerator, or resource recovery facility shall be used, operated, and maintained in accordance with the following regulations:*

(1) *An attendant shall be kept on duty during hours the disposal area is open to control deposit of refuse.*

(2) *The disposal area shall be enclosed sufficiently by a fence with gate or by other means so as to limit use to authorized periods, and for proper purposes.*

(3) *No burning of refuse shall be permitted within 10,560 feet of any residentially zoned property in the incorporated or unincorporated territory of Broward County, except by combustion in a completely enclosed incinerator or resource recovery facility of adequate design and operation to prevent emission of fly ash and dense smoke. There shall be no burning of refuse between the hours of 7:00 p.m. and 7:00 a.m.*

(4) *No refuse to be deposited within any required yard.*

(5) *Refuse is to be compacted daily and topped by a soil cover daily.*

(6) *Maximum height of a landfill shall not exceed one hundred twenty-five (125) feet above adjacent ground level."*

Setbacks for recycling facilities in industrial zoned districts are noted in Section 39-313. Recycling facilities must be located a minimum of 500 feet from residentially zoned districts and a minimum of 200 feet from business zoned districts.

Broward County Land Use Plan[89] of the Broward County Comprehensive Plan allows municipalities to rearrange land uses to address municipal-level land use planning issues without the need for County Commission approval.

Depending on specific facility type(s) and proposed location(s), appropriate zoning requirements and setbacks will need to be determined for any planned future facilities.

4.0 ECONOMIC AND REGULATORY FLOW CONTROL REVIEW

This section discusses flow control as a means of solid waste management and provides a comparison of regulatory flow control versus economic flow control.

4.1 SOLID WASTE FLOW CONTROL

Flow control is the ability to direct the ultimate disposition of solid waste generated within the boundaries of a governmental entity to a specific facility for processing, recovery, transfer, energy production or disposal. Flow control is a mechanism used by local governments to generate revenue to support the development and operation of waste management facilities, particularly those requiring large capital investments (e.g., landfills, materials recovery facilities, transfer stations, waste to-energy facilities). There are two types of flow control: economic and regulatory. Economic flow control uses financial mechanisms to encourage solid waste to be delivered to a designated facility for processing, treatment, or disposal while regulatory flow control uses legal provisions (i.e., contracts) to require solid waste to be delivered to a designated facility for processing, treatment, or disposal.

Flow control assists governmental entities with generating and guaranteeing revenue for their solid waste management system. Directing the flow of waste to Broward County solid waste facilities is a key component to implementing a regionalized solid waste system, as it will be required in order to obtain financing, such as revenue bonds, needed to implement future solid waste disposal facilities. Additionally, enacting solid waste flow control in Broward County will create a dedicated revenue stream, through user and/or tipping fees, needed to repay the debt incurred to finance the implementation of the regional solid waste system as well as pay for operating and maintenance costs. System wide flow control could be implemented in Broward County through regulatory/ contractual, or economic mechanisms.

4.1.1 Flow Control Background

In 1992, Congress directed the United States Environmental Protection Agency to submit a report to Congress on flow control as a means of municipal solid waste management to protect human health and the environment; and develop State and local waste management capacity and achieve local goals for source reduction, reuse, and recycling. Flow control mechanisms have been debated and have faced legal scrutiny within the waste management industry and environmental groups.

4.1.2 Federal Consideration - Regulatory Flow Control

Regulatory flow control uses the regulatory abilities of a governmental entity to dictate the flow of waste. In the past, regulatory solid waste flow control was implemented through general law or

[89] BrowardNEXT - Broward County Land Use Plan https://www.broward.org/PlanningCouncil/Documents/LandUsePlan/BrowardNext%20Broward%20County%20Land%20Use%20Plan.pdf

special act as part of the charter establishing the creation of the governmental entity controlling the disposition of the waste.

During the 1990's, several court decisions ruled against the use of flow controls and most notably, in May 1994, the United States Supreme Court in C & A Carbone, Inc. vs. Town of Clarkstown 511 U.S. 383 (1994) (Carbone) decided that the use of flow control can discriminate against interstate commerce and, therefore, can violate the commerce clause of the United States Constitution. Specifically, the United States Supreme Court found the town law discriminated against interstate commerce by favoring a single local waste processor and depriving competitors, including out-of-state firms, of access to a local market. Following the Carbone ruling, some local governments were able to achieve similar results by relying on competitive and negotiated contracts with haulers, franchising systems, and competitive pricing. The courts found these alternative approaches non-discriminatory and upheld them if local benefits from facility designation outweighed effects on interstate commerce. Interstate commerce is less likely to be an issue given the distance it takes to leave the state from Broward County.

More recently, in 2007, in United Haulers Association v. Oneida-Herkimer Solid Waste Management Authority, 550 U.S. 330 (2007) (United Haulers) the United States Supreme Court revisited the flow control issue, this time in a context where, unlike the Clarkstown transfer station, the designated facilities were publicly owned. In this case the court ruled that County ordinances requiring haulers to deliver locally generated waste to publicly owned waste facilities did not discriminate against interstate commerce. The majority opinion found that the ordinances merely enabled the counties to pursue traditional policy power functions and that the underlying policy choice (i.e., public sector waste handling) should be free from court interference. Analyzing the ordinances under the burdens-versus-benefits test, the United States Supreme Court found that the public benefits of flow control outweighed whatever burden on commerce might exist. However, since this ruling, there have been other federal court challenges resulting in injunctions prohibiting governmental entities from enforcing their flow control ordinances due to issues other than violation of the interstate commerce clause. Therefore, relying on local ordinance driven regulatory flow control may result in legal challenges and increased risk related to dependent financing.

4.1.3 State Considerations – Regulatory Flow Control

The State of Florida enacted Florida Statute (F.S.) 403 Environmental Control Part IV Resource Recovery and Management to plan for and regulate all aspects of solid waste with the goal of protecting public safety, health, welfare; and enhancing the environment for the people of this state; and recover resources which have the potential for further usefulness. F.S. 403.713(2) states that "*Any local government which undertakes resource recovery from solid waste pursuant to general law or special act may institute a flow control ordinance for the purpose of ensuring that the resource recovery facility receives an adequate quantity of solid waste from solid waste generated within its jurisdiction*." The statute further defines resource recovery as "*the process of recovering materials or energy from solid waste*."

The existing WTE facility, Broward County South Resource Recovery Facility meets the definition of a resource recovery facility described in F.S. 403.713(2). Additionally, considering the broader definition of resource recovery described in F.S. 403.703(32), the proposed Material Recovery Facility (MRF), Mixed Waste Processing (MWP) Facility and Bulky Waste (BW)/Yard Trash (YT) Facilities that recover materials from solid waste and would be utilized to meet the short, mid, and long-term disposal needs for Broward County. In addition, certain types of organics processing facilities may also meet the definition of resource recovery described in F.S. 403.703(32) if they

generate electricity, such as through use of an anaerobic digestion process, or recover material such as to produce a soil amendment. Therefore, specifying flow control to Broward County South and other solid waste facilities (MRF, MWP, etc.), within the governmental entity charter may allow for regulatory ordinance-driven flow control of solid waste to these facilities. However, careful consideration must be made in developing the flow control ordinance within the charter to limit legal risk associated with interstate commerce issues.

4.1.4 Applicability to the Solid Waste Authority of Broward County

§ 403.706 (1), F.S. (2013) states in part that "*The governing body of a county has the responsibility and power to provide for the operation of solid waste disposal facilities to meet the needs of all incorporated and unincorporated areas of the county*." Florida Statutes does not prescribe how this responsibility is achieved.

The Solid Waste Authority of Broward County was established via an Interlocal Agreement (ILA) on May 23, 2023 with the purpose to "*develop and implement a long-term, environmentally sustainable, transparent, innovative, and economically efficient plan and approach to disposal, recycling, and reuse of waste generated in Broward County*." The County entered into a new ILA in 2023 with 28 of 31 municipal cities within Broward County, which created an independent legal entity, the "Solid Waste Disposal and Recyclable Materials Processing Authority of Broward County, Florida" (Authority).

The general powers of the Authority pursuant to the new ILA include establishment of rates, fees and other charges; Recyclable Materials and Recovered Materials facilities, processing, and programs; collection and transportation services; Authority Solid Waste disposal; issuance of bonds, commitment of System Waste; and regulatory flow control.

The current ILA requires all participating municipalities to comply with the requirements of ordinances noted in Sections 11.2, Regulatory Flow Control (Flow Control Ordinance) and 11.4, System Waste Reporting Ordinance. As noted in Section 11.2, Regulatory Flow Control, each participating municipality is required to enact a Flow Control Ordinance pursuant to Section 403.713, FS and direct all System Waste generated within its geographic boundary to be delivered to the System, except for waste that is designated to be transported outside the state.

System Waste Reporting Ordinance requires all participating municipalities to obtain and maintain monthly reports from each hauler, which includes the quantity of System Waste collected (for each category) and receiving facility details.

While the Solid Waste Authority of Broward County has the power and duty to establish, operate, and maintain the infrastructure and facilities overseen, owned, operated, acquired, or contracted for by the Solid Waste Authority of Broward County, each party to the ILA retains ultimate responsibility within its jurisdiction for supervising waste and recycling as provided by applicable law.

4.2 REGULATORY AND ECONOMIC FLOW CONTROL

Regulatory (contractual) and economic flow control mechanisms could be implemented to direct solid waste to the system facilities and the potential impacts of implementation of flow control are discussed below.

4.2.1 Regulatory or Contractual Flow Control

Regulatory or contractual flow control can be achieved through the development of interlocal agreements between Cities and the new solid waste governance system. As mentioned in Section 4.1.4 above, Broward County has incorporated a flow control ordinance in the new ILA that was executed in May 2023. The 28 municipalities in Broward County that have entered into an ILA have a commitment to deliver all System Waste to facilities within the System[2] thereby guaranteeing minimum capacity requirements. In addition, the new ILA specifies that each hauler provide a detailed monthly report to their contracting municipality including details of waste tonnage collected for each category of System Waste, and where such waste was transported to and the facility delivered to. This enables the Authority to track all waste generated within its System, provides better identification of haulers suspected of any non-compliance and enhanced control over private facilities within the County. On the other hand, increased reporting requirements may be cost prohibitive and possibly drive smaller companies out of the market place that could potentially violate parts of F.S. 403.70605 Solid Waste Collection Service in Competition with Private Companies.

4.2.2 Economic Flow Control

Economic flow control could be achieved by providing solid waste processing and disposal services at the lowest total cost, creating an economic incentive to direct solid waste to the System facilities. To attain the lowest total cost, fees could be subsidized through an annual assessment or non-ad valorem property tax to residents within the participating Cities; or alternative sources of funding, such as charging user-based waste generation fees or instituting environmental investment charges for haulers and/or generators bypassing system facilities or through implementing a combination of these funding sources. This enables solid waste flows to the System facilities guaranteeing minimum capacity requirements. However, care must be taken as to not violate any parts of F.S. 403.70605 Solid Waste Collection Service in Competition with Private Companies to reduce legal risks.

4.3 COMPARISON OF REGULATORY AND ECONOMIC FLOW CONTROL AND BROWARD COUNTY CONSIDERATIONS

Since the Solid Waste Authority of Broward County does not currently own any solid waste facilities, regulatory flow control may not be feasible at present. However, as mentioned before, the 28 municipalities in Broward County that have entered into an ILA have a commitment to deliver all System Waste to facilities within the System. This delivery commitment is an effective contractual flow control mechanism that will be very beneficial in the future if and when the Solid Waste Authority of Broward County starts developing its own solid waste facilities, as the Authority will be able to direct the waste tonnage to specific facilities as needed to support facility operations.

Through the Regional Solid Waste and Recycling Master Plan, the SCS Team will present detailed recommendations concerning operations and facilities (including facility type, size, placement, etc.) needed to create a regional solid waste and recycling system for solid waste generated within Broward County. Currently, the County owns the following solid waste management assets:

- Southwest Regional Landfill
- South Resource Recovery Plant/Ash Monofill (land only)
- Alpha 250 North/South
- North/Central/South Trash Transfer Stations

Given the need to effectively manage the solid waste generated in the County, these facilities are not expected to meet the solid waste and recycling needs of the County over the planning horizon. While it is not yet known whether the Authority will seek to procure any new solid waste and recycling management services are facilities and/or utilize private solid waste and recycling management infrastructure, flow control limitations must be considered, especially where financing will be dependent on a secure revenue stream. The relative impacts of implementing economic or regulatory/contractual flow control are presented below in Table 3.

Table 3. Relative Risks of Economic and Regulatory/Contractual Flow Control

Attribute	Economic Flow Control	Regulatory/Contractual Flow Control
Financing	High	Low
Construction	High	Low
Operation	Medium	Low
Residential Customers	High	Low
Commercial Customers	High	Medium

The relatively higher risk associated with economic flow control in Broward County is primarily associated with the limited municipal recycling processing and disposal capacity. Accordingly, to effectively implement economic flow control, the facilities would need to set rates at or below market rates to attract solid waste and recyclable materials. Alternatively, by implementing regulatory flow control, the Solid Waste Authority of Broward County could specify the recycling and disposal facilities in the collection agreements, thus assuring a relatively predictable revenue stream. Having both contractual requirements and an ordinance may help protect against unforeseen circumstances in maintaining flow control.

To assure the financial strength necessary to develop its own infrastructure, and in consideration of the ease of implementation, the use of regulatory flow control is recommended. The Solid Waste Authority of Broward County could also employ a hybrid system that uses both financial and contractual mechanisms to cause solid waste and recyclable materials generated by residential and commercial generators to be transported to designated facilities. This is the approach used by the Solid Waste Authority of Palm Beach County where residential and governmental properties are assessed for 100% of their disposal fees, and in order for the solid waste collection companies to receive credits they must bring the waste to a Solid Waste Authority of Palm Beach County designated facility. Through the use of both financial and contractual mechanisms along with an assessment program, the only portion of the waste stream that is potentially at risk is the commercial waste in the municipalities. To minimize the risk associated with commercial waste, the Solid Waste Authority of Palm Beach County adjusts the commercial assessment to decrease or increase the tipping fee as local markets dictate.

5.0 OVERVIEW OF EFFECTIVELY SITING NEW FACILITIES TO MEET FUTURE PROCESSING AND DISPOSAL NEEDS

Once the need for a solid waste facility and its processing or disposal capacity to meet future demand is defined, the next step in its development is the selection of an appropriate site within the service area. The siting of new solid waste facilities is a challenging process that considers many possible community, political, logistical, regulatory, and financial constraints based on the size and type of facility. The siting criteria includes eight general categories, as follows:

- **Location** – Site location within the County relative to waste sources, proximity to residential zoning, and expected effects on the existing solid waste system operations.
- **Utilities** – Availability of potable water, sanitary sewer, natural gas and electric utilities, and any stormwater and groundwater considerations at the site.
- **Soils** – Identification of soil types at the site and potential effects on site development.
- **Environment** – Consideration of a range of environmental factors, including floodplains, wetlands, threatened and endangered species, and permitting issues.
- **Transportation** – Proximity to major roads, available road access to the site and improvements needed, if any.
- **Community** – Estimate of public response to potential construction of the facility at the site considering proximity to residential zoning, nuisance concerns, environmentally sensitive areas, environmental justice concerns, and others.
- **Cost** – Estimate cost of developing the facility at the site, including factors such as floodplain, wetlands, and wildlife mitigation, removal of unsuitable soils, importing and placing fill to elevate structures to meet resiliency requirements, utility extensions and modifications, etc.
- **Schedule** – Estimate of time needed to the start of commercial operations, considering the site development factors listed above and time needed for County procurement, permitting, potential legal actions, material fabrication and delivery, construction, etc.

Appendix H

Task 3 White Paper – Financial Overview

Solid Waste Authority of Broward County

Task 3 White Paper:
Financial Overview

Solid Waste Authority of Broward County
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1.0 INTRODUCTION

The Interlocal Agreement (ILA) for solid waste disposal and recyclable materials processing in Broward County, Florida, was established to create the Solid Waste Disposal and Recyclable Materials Processing Authority of Broward County, Florida (Authority). The ILA is the contractual framework to develop and implement a long-term, environmentally sustainable, transparent, innovative, and economically efficient plan for waste disposal, reduction, recycling, and reuse. Historically, Broward County and 26 of its 31 cities formed the Resource Recovery Board (RRB) in 1986, investing approximately $1 billion in two (2) waste-to-energy facilities. However, the RRB dissolved in 2013, leading to a fragmented waste management system and a decline in recycling rates from 60% in 2013 to 30% in 2023. The new ILA seeks to revive regional collaboration to improve recycling rates and waste management efficiency by leveraging common goals, unified structure, and economies of scale.

Economically, the ILA was designed to streamline and enhance waste management and recycling services by fostering regional collaboration among the county and its municipalities. The primary goals were to reduce costs for participating members through economies of scale and more efficient operations, leading to more predictable and stable waste management expenses. The ILA contemplates significant infrastructure investments, either through ownership or service agreements, to achieve higher recycling rates and lower long-term disposal costs. Additionally, the Authority established by the ILA would have the power to impose special assessments to finance its operations and capital improvements, contributing to economic stability. By unifying waste and recycling management services, the ILA aimed to enhance the Authority's negotiating power, securing better contracts and terms, ultimately benefiting the municipalities economically through a more efficient, cost-effective, and sustainable waste management system.

1.1 OBJECTIVE

The objectives of this White Paper are as follows:

- Compare local tipping fees, processing fees, market prices for recovered materials, and additional pertinent information in relation to the overall economic landscape
- Analyze the System mass balance, including estimated tonnages and market shares
- Compare regional pricing against other counties of similar size
- Examine opportunities for economies of scale and collaboration to minimize processing, transportation, disposal, and other pricing equivalences

2.0 LOCAL FINANCIAL OBLIGATIONS

2.1 PART I – ILA MEMBER COMMUNITIES

This White Paper aims to capture and understand the local financial obligations related to solid waste collections based on the level of service and costs related to waste management services to provide valuable insights into economic landscape of solid waste management, helping the Authority make informed decisions to enhance efficiency and sustainability for the following 29 ILA member communities:

- Broward County (Unincorporated)
- Coconut Creek
- Cooper City
- Coral Springs
- Dania Beach
- Davie
- Deerfield Beach
- Fort Lauderdale
- Hillsboro Beach
- Hollywood
- Lauderdale Lakes
- Lauderdale-by-the-Sea
- Lauderhill
- Lazy Lake
- Lighthouse Point
- Margate
- Miramar
- North Lauderdale
- Oakland Park
- Parkland
- Pembroke Park
- Plantation
- Sea Ranch Lakes
- Southwest Ranches
- Sunrise
- Tamarac
- West Park
- Weston
- Wilton Manors

Among the ILA member communities, the SCS Team was able to obtain all or some relevant data from 29 communities.

2.1.1 Data Collection

The SCS Team researched the following key information on the solid waste programs for each of the ILA member communities:

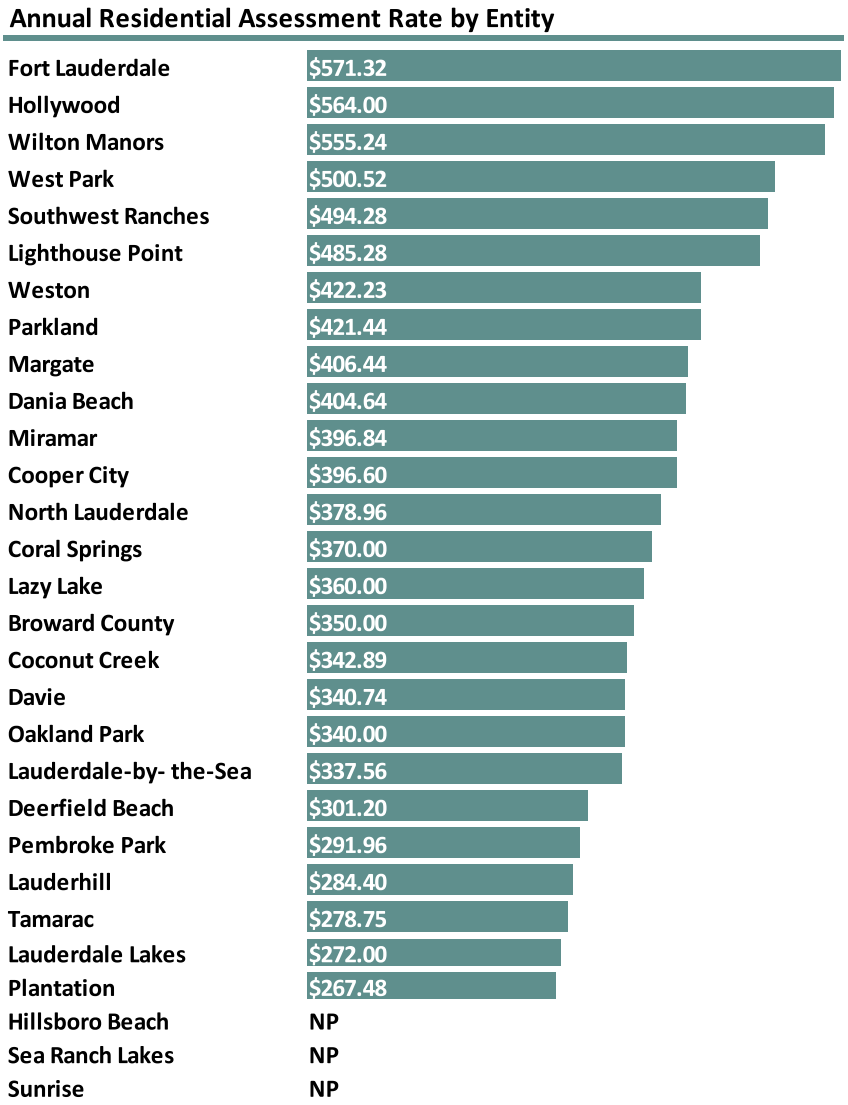
- Population

- Services Provided: municipal solid waste (MSW), recycling, yard waste (YW), construction and demolition debris (C&D), white goods (WG, which are often treated as bulk waste (BW)), electronics, and household hazardous waste (HHW)
- Service Frequency
- Service Rates: Collection, Recycling, Disposal, Administration, and Annual Residential Assessment

2.1.2 Comparison and Analysis

The Fiscal Year 2025 annual residential assessments from each ILA member community was inputted to the Rate Benchmarking Model and are presented below in **Figure 1**.

Figure 1. Annual Residential Assessment Rate by Entity



Notes:

- Annual assessment data provided via data request to ILA communities
- NP = not provided

Fort Lauderdale currently has the highest annual residential assessment rate at $571.32, however, to fully understand the implications of the rate comparison factors such as population and service levels must also be accounted for each ILA member community. Further information can be found in Section 2.1.3. Furthermore, there were two ILA member communities that provided levels of service information without the annual residential assessment costs.

2.1.3 Service Level & Costs

The following information is based on the 2023 Broward County and Municipal Population Forecast and Allocation Model (PFAM), published by the Broward County Planning and Development Management Division and the Fiscal Year 2025 residential solid waste assessment data provided by each ILA community.

Fort Lauderdale

With a population of approximately 187,000, Fort Lauderdale collects MSW twice a week, recyclables once a week, and YW once a week. While the municipality does not collect C&D and HHW waste only during collection events, it collects WG once a month and electronics weekly on a call basis schedule. The breakdown of the $571.32 annual residential assessment is unclear.

Hollywood

In Hollywood, which has a population of approximately 152,000, residents receive services for MSW, recyclables, YW, WG, and electronics. MSW is collected twice a week, recyclables and YW once a week, WG once a month, and electronics twice a year. The annual residential assessment is $564.00. Included in the annual cost are $27.50 MSW and Recycling, $11.50 Disposal, and $8.00 Administration costs.

Wilton Manors

Wilton Manors has a population of approximately 12,000 and provides twice a week MSW, once a week recycling as well as once a month WG, electronics, and HHW collection services. It's unclear whether residents receive YW and C&D collection services. The annual residential assessment is $555.24.

West Park

West Park has a population of approximately 15,000 and collects three types of waste: MSW, recyclables, and YT. MSW and recyclables are collected twice and once a week, respectively. West Park collects YW once a month. Compared to other municipalities, West Park provides a relatively low service level to its residents. The breakdown of the $500.52 annual residential assessment is unclear.

Southwest Ranches

Southwest Ranches provides a relatively high level of service to its population of approximately 8,000. Included in their $494.28 annual residential assessment are: MSW, recycling, YT, WG, electronics, and HHW. Bulk pickup is limited to twelve (12) cubic yards (CY) and C&D is not collected. MSW collection is performed twice a week and recycling collection is performed once a week. Both YW and WG are collected twice a month; electronics and HHW are collected four times a year. Residents pay a monthly fee of $29.31 for MSW and recycling collection and $11.88 for disposal and recycling processing.

Lighthouse Point

In Lighthouse Point, which has a population of approximately 11,000, residents receive services for MSW, recyclables, YW, and WG. MSW is collected twice a week, recyclables once a week, and both YW and WG twice a week. The annual residential assessment for these services is $485.28. While the breakdown of the cost was not provided, units greater than four pay a lower rate at $444.36.

Weston

Residents of Weston, which has a population of approximately 68,000, receive services for MSW, recyclables, bulk pickup, HHW and trash drop stations. MSW is collected twice a week, recyclables, once per week, and bulk pickup (which includes WG, large items, etc.) is provided four times a year. Additionally, HHW collection events are held two times per year and trash drop stations are open year-round. Residents are charged $422.23 per year for these services.

Parkland

In Parkland, which has a population of approximately 37,000, residents receive services for MSW, recyclables, YW, and WG. MSW is collected twice a week, recyclables once a week, YW twice a week, and WG once a month. The annual residential assessment for these services is $421.44.

Margate

Margate, with a population of approximately 59,000, provides comprehensive waste management services, including MSW, recyclables, YW, WG, electronics, and HHW. MSW and recyclables are collected twice a week, YW once a week, WG once a year, and both electronics and HHW three times a year. The annual residential assessment for these services is $406.44, which includes $19.26 for collection, $5.48 for recycling, and $9.13 for disposal.

Dania Beach

Residents of Dania Beach, which has a population of approximately 33,000, receive services for MSW, recyclables, YW, C&D, and WG. MSW is collected twice a week, recyclables once a week, and YW, C&D, and WG are collected once a month. The annual residential assessment for these services is $404.64, which includes a monthly fee $27.02 for collection and disposal and $6.52 for recycling collection and processing.

Miramar

Residents of Miramar, which has a population of approximately 136,000, receive services for MSW, recyclables, YW, and WG. MSW is collected twice a week, recyclables once a week, and both YW is collected once a month with WG. The annual residential assessment for these services is $396.84, which includes a monthly fee of $20.49 for collection, $9.61 for disposal, and $2.97 for administration costs.

Cooper City

In Cooper City, which has a population of approximately 35, residents receive services for MSW, recyclables, YW, WG, electronics, and HHW. MSW is collected twice a week, recyclables once a week, and YW twice a week. WG are collected once a month, and both electronics and HHW are collected 12 times a year. The annual residential assessment for these services is $396.60. The cost of service are as follows $18.56 for collection, $79.13 for recycling, $103.69 for disposal, and $6,080 for administration costs.

North Lauderdale

North Lauderdale, with a population of approximately 43,000, has an annual residential assessment of $378.96. Services and frequency of service were not provided.

Coral Springs

Coral Springs, with a population of approximately 134,000, offers comprehensive waste management services, including MSW, recyclables, YW, C&D, WG, and electronics. MSW is collected twice a week, recyclables once a week, YW once a week, C&D once a week, WG once a week, and electronics once a week. At Coral Springs, BW cannot exceed six (6) CY and only two (2) CY of the six (6) CY may be C&D debris. The annual residential assessment is $370.00. The cost of service breakdown are $107.03 for collection, $34.00 for recycling, $123.80 for disposal, and $7.91 for administration costs. There is also a franchise fee of $76.32 and a contingency fee of $6.14. Residents are eligible to receive an early payment discount of $14.80.

Lazy Lake

Lazy Lake, with a population of 33, offers services for MSW, recyclables, YW, and WG. MSW is collected twice a week, recyclables and YW once a week, and WG once a month. The annual residential assessment for these services is $360.00.

Broward County

Broward County, with a population of approximately 16,000, has an annual residential assessment of $350.00. The level of service was not provided.

Coconut Creek

Coconut Creek, with a population of approximately 60,000, provides a range of waste management services, including MSW, YW, BW, WG, electronics, and HHW. The collection frequency for MSW is twice a week, while YW and BW are collected once a week. WG are collected once, but the unit of time was not specified, and electronics are collected twice a year. The annual residential assessment for these services is $342.89, which includes annual costs of service of $157.44 for collection, $94.32 for disposal, $45.72 for franchise fees, and $45.41 for other costs.

Davie

In Davie, with a population of approximately 106,000, waste management services include MSW, recyclables, YW, and WG. MSW is collected twice a week, while YW and WG are collected once a month. The Town of Davie does not currently provide residential recycling collection service. Instead, residents can dispose of recyclable materials as part of the MSW collection. Once collected, MSW is sent to the South Broward Resource Recovery Facility. The annual residential assessment is $340.74, which includes $114.60 annually for collection and $150.00 for disposal. Additional fees include a franchise fee of $54.72, legal services, and an HHW fee.

Oakland Park

Oakland Park provides twice a week MSW, once a week recycling, once a month YT, bulk, and electronics to its residents of approximately 46,000. These services are provided by the municipality, and residents can also request C&D collection for a fee. While the specific costs related to collection, disposal, and administration were not provided, residents pay an annual residential assessment of $340.00.

Lauderdale-by-the-Sea

Lauderdale-by-the-Sea provides twice a week MSW, once a week recycling, once a week YT, and once a month white goods services to its residents of approximately 6,000. Residents pay an annual residential assessment of $337.56. The town also has a Commercial Recycling Program, where it provides and maintains the recycling carts. Commercial customers can sign up to receive recycling services for additional charge. The type of recyclables collected, and the exact cost of service were not provided.

Deerfield Beach

Deerfield Beach, with a population of 92,000, provides its own collection services for MSW, YW, WG, and electronics. MSW is collected twice a week, YW once a week, and both WG and electronics are collected once a week. C&D is collected by on-call basis. The annual residential assessment based on the $25.10 monthly rate for these services is $301.20.

Pembroke Park

With an estimated population of 6,000, Pembroke Park provides MSW, recycling, YT, WG, and electronics collection services to its residents. MSW is collected twice a week, recycling once a week,

and YT, WG, and electronics are collected every other month. Based on the $24.33 monthly rate, the annual residential assessment for these services is $291.96.

Lauderhill

Residents of Lauderhill, which has a population of 77,000, receive services for MSW, recyclables, YW, and WG. MSW is collected twice a week, recyclables once a week, YW (frequency unclear), and WG once a month (twice a month in December). Residents pay $284.40 annually for these services.

Tamarac

In Tamarac, which has a population of approximately 73,000, residents receive services for MSW, recyclables, YW, WG, and electronics. MSW is collected twice a week, recyclables, YW, and Residential WG once a week, and electronics once a month. Commercial/Multifamily WG as well as other waste are collected once a month. While the costs of services provided are incomprehensive, City provided that recycling costs $4.77 and cost per residential unit collections is $16.99. Residents are billed $267.48 on their property tax bill for solid waste services.

Lauderdale Lakes

Residents of Lauderhill, which has an approximate population of 35,000, receive services for MSW, recyclables, and WG. MSW is collected twice a week, recyclables once a week, and WG once a month. The cost for these services is $272.00.

Plantation

Plantation, with a population of approximately 98,000, provides services for MSW, recyclables, YW, and WG. MSW is collected twice a week, recyclables once a week, YW twice a week, and WG once a month. C&D is not collected. The base annual residential assessment for these services is $267.48, which is based on the monthly rate of $22.29 for residential customers. It is important to note that residential customers are also required to purchase[1] specific bags for MSW and recycling and the number of bags each resident uses will affect the overall annual residential assessment. City staff shared that a portion of disposal cost is included in the MSW garbage bag fee. Curbside cart customers pay a monthly fee of $33.29, which equates to an annual residential assessment of $399.48.

2.1.4 Service Level Only

The following municipalities did not provide annual residential assessment but have provided some level of relevant information that is important to the Study and comparison.

Hillsboro Beach

Hillsboro Beach, with a population of 2,000, offers services for MSW, recyclables, YT, and WG. MSW is collected twice a week and recyclables once a week. Both YT and WG are collected once a week as

[1] Costs vary depending on the size of the bag, ranging from $0.65/bag to $1.10/bag.

part of Bulk Waste. Residents can also utilize a drop-off site for electronics recycling. The cost for these services was not provided.

Sea Ranch Lakes

Sea Ranch Lakes, with a population of 400, offers services for MSW, recyclables, and WG. MSW is collected twice a week, recyclables once a week, and WG once a month. The cost for these services was not provided.

Sunrise

Sunrise, with a population of approximately 103,000, provides services for MSW, recyclables, YW, and WG. MSW is collected twice a week, recyclables once a week, and WG are collected once a week. Yard waste is collected with MSW or with WG. The annual residential assessment was not provided however the monthly cost of services are as follows: $18.75 for collections (Class I Customers), $2.06 for recycling, and disposal at $30,454.54 (total).

2.2 CONCLUSION

The levels of service and annual residential assessments in the ILA member communities vary significantly. Among the 29 ILA member communities that provided service level information, all of them provide twice a week MSW collection service. Most ILA member communities provide weekly recycling services, but the frequency of YT, WG, electronics, and HHW collection varies. The annual residential assessments reflect these service levels and include various costs such as collection, recycling, disposal, administration, and other fees. The average residential assessment of the ILA member municipality is $396.05.

Overall, ILA member communities with higher service levels tend to have higher annual assessments, while those with fewer services or less frequent collections have lower assessments. However, there were also anomalies where a high annual residential assessment did not directly correlate to the level of service when comparing ILA member communities. For instance, residents in West Park pay $500.52 in annual residential assessments and receive no other collection services other than MSW, recycling, and YW. Residents receive higher level collection services in Plantation at an annual rate of $267.48. It is important to note that factors such as population and the cost of non-curbside pickups such as HHW events and Waste Transfer Stations as well as the disposal cost may affect the cost of service. A further analysis of the different disposal alternatives and its costs will be beneficial in determining future operations.

The study also found that of the ILA communities that provided service level information, only four ILA communities clearly indicated that they provide C&D collection services. Each community offers the service at a varying frequency. Coral Springs and Dania Beach provide weekly and monthly C&D collection services, respectively while both Deerfield Beach and Oakland Park provide on-call basis pickups with additional fees. Among these communities, a higher residential assessment did not necessarily mean higher service levels. Between Coral Springs and Dania Beach, Coral Springs offers a higher level of service at a lower residential assessment rate than Danial Beach. While Deerfield Beach and Oakland Park charge for C&D collection, Deerfield Beach has a more comprehensive collection service included in their $301.20 fee.

2.3 PART II – TIPPING FEES

Below is a list of select landfills, transfer stations, and recycling facilities located in Broward County and the associated tipping fees by material. It is important to note that these fees are the "gate rates" and do not reflect all solid waste farcicalities located in Broward County.

Broward County Landfill

Yard Trash: $75.00
C&D: $100.00
Bulk: $100.00
Tires: $130.00 – rims less than 25 inches in diameter

Medley Landfill

Class I: $74.40 / $113.19 - with and without a contract with Dade County
Class III: N/A – WM limits to Class 1 only
Restrictions: Restricted to Dade County or WM internal volume

Monarch Hill Landfill

Class I: $105.51
Class III: $105.51
Restrictions: limitation on class 1 material of 175k per year

Okeechobee Landfill

Class I: $59.79
Class III: $59.79

WM Recycling Oakes Road

Class III: $75.00
Yard Trash: $65.00
C&D: $68.00

WM Recycling Deerfield

Class I: Only accepts Broward overflow waste at contract rate.

WM Davie Transfer Station

Class I: Only accepts Broward overflow waste at contract rates.
Single Stream Recyclables: Only accepts Reuters material under contract.

Reuters Recycling Facility

Single Stream Recyclables: Only accepts recycling under contract.
Class I (Residential): $85.00
Class I (Commercial): $85.00
WG: Not accepted.
Yard Trash: $85.00
C&D: $85.00

2.4 CONCLUSION

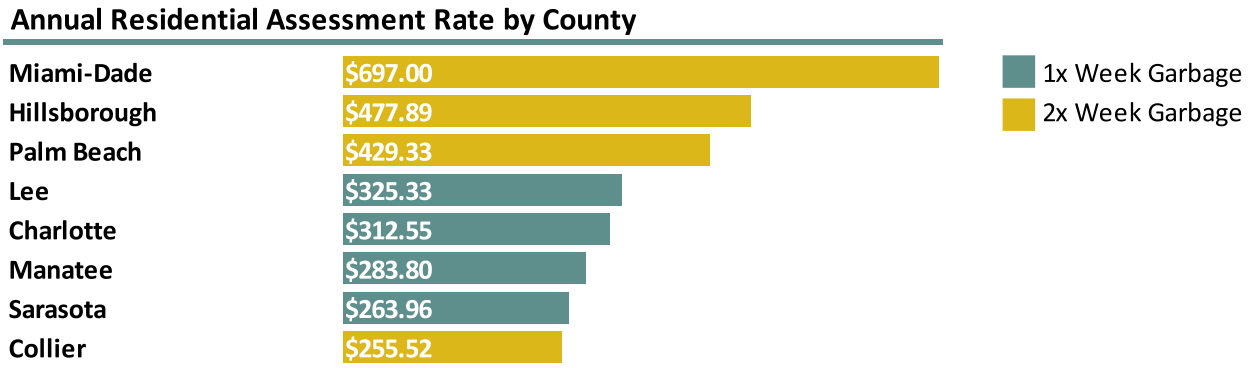
While the rates above only reflect gate rates at select facilities, it highlights how much tipping fees can vary. This variation highlights the importance of tailoring costs that will equitably benefit the needs and balance the cost considerations of each ILA member community.

2.5 PART III – REGIONAL RESIDENTIAL ASSESSMENT

2.5.1 Cost of Service

Comparable counties in Florida such as Collier, Sarasota, Manatee, Charlotte, Lee, Hillsborough, Miami-Dade, and Palm Beach were surveyed to capture a high-level overview of residential solid waste service fees. The residential assessment survey data is presented below in **Figure 2**.

Figure 2. Annual Residential Assessment Rate by County



Residential assessment rates vary by county but generally, counties with higher levels of service, with the exception of Collier County, have higher rates. Miami-Dade and Palm Beach counties increased their rates in the last couple of years for different reasons. Miami-Dade had raised its sanitation rates from $484.00 to $509.00 following the economic strains due to COVID-19 in 2022 and it appears that there had been another rate increase since. Miami-Dade currently has the highest residential assessment rate and provides garbage collection twice a week to its residents. Palm Beach County services trash collection to its six unincorporated areas and adapted an inflationary increase of about 6%. The current average residential assessment rate in Palm Beach County is $429.33. Cities in unincorporated areas are responsible for providing their own trash collection services. For example, the City of West Palm Beach provides collection services twice a week for $269.40, which is lower than the average cost of service in unincorporated areas.

2.6 CONCLUSION

In comparison to other counties, the average annual residential assessment in the ILA communities fall relatively low at $396.05. ILA member communities may achieve an even lower residential assessment similar to Collier County by securing a long-term contract with services providers with specific limitations to annual price increases. This ensures manageable and predictable costs for residents.

3.0 LEVERAGING ECONOMY AT SCALE

3.1 POTENTIAL FINANCIAL BENEFITS

Each ILA member serves a unique community, each with their own challenges. Through active efforts towards having an aligned collection agreement, the Authority may see impactful financial benefits. The following sections identify potential financial benefits of providing a harmonization of services.

3.1.1 Cost Savings

Consolidating waste management services may help municipalities achieve reducing overall costs for waste collection, disposal, and recycling. Through shared resources and centralized operations, a more efficient service delivery can be reached. Additionally, ILA member communities can take a unified approach to strengthen the Authority's ability to negotiate favorable contracts with waste management providers, potentially securing better terms and lower costs for services. Currently, contract terms vary even with the same collection hauler.

3.1.2 Predictable Expenses

The ILA provides the framework to establish consistent rates, fees, and charges, providing municipalities with more predictable and stable waste management costs. This helps each ILA member community budget more effectively and avoid unexpected financial burdens.

3.1.3 Infrastructure Investment & Revenue Generation

Modern infrastructure can lead to more efficient processing and lower operational costs. The ILA may facilitate investments in new facilities, such as recycling centers or materials recovery facility (MRF), which can improve recycling rates and reduce long-term disposal costs. Funding for these facilities may be accomplished through special assessments and/or through bonds based on the financial health of the Authority. Through utilizing these facilities, the Authority has revenue generation potential depending on the material of the recyclables. **Figure 3** below presents the tons of recyclables collected by ILA communities in 2023 and the average market value (AMV) by material type as of September 2024. The AMV is an industry standard to calculate the value of each recyclable commodity and is adjusted at least monthly.

Figure 3. The Average Market Value per Ton of Recyclable Materials

Waste Type Collected

Waste Type	Tons
#1 PET Bottles	63,455
#2 HDPE Colored Containers	17,250
#2 HDPE Natural Containers	10,133
Aluminum Cans	19,250
Aseptic Containers	9,187
Glass Containers	73,492
Mixed Paper	156,071

AMV Evaluation by Material Type

Materials	AMV
PET Plastic	$ 15.68
HDPE Natural	$ 11.18
HDPE Colored	$ 3.45
Aluminum	$ 30.44
Cartons/Aseptics	$ -
Mixed Glass	$ (3.81)
Mixed Paper	$ 5.59

Public Ownership Benefits

Retaining public ownership of waste management and recycling facilities ensures that the benefits of any cost savings or revenue generation are reinvested into the community, rather than going to private companies. The Authority can utilize revenue generated in community engagement, outreach, and education to heighten recycling rates.

3.2 BENEFITS OF ESTABLISHING DISTRICTS AND FRANCHISE ZONES

3.2.1 Cost Savings

Establishing districts and franchise zones can lead to significant financial benefits through economies of scale and cost savings. By consolidating service areas, the Authority can streamline and optimize operations. Competitive bidding for franchise zones encourages waste collection companies to offer better rates, driving down service costs. Additionally, centralized management may reduce administrative overhead.

3.2.2 Revenue Generation

Franchise zones provide opportunities for revenue generation through franchise fees and special assessments. These fees can be charged to service providers for the right to operate in specific zones. Through franchise agreements, franchise zones can impose fines to not only ensure high quality services but also an additional revenue stream.

3.2.3 Improved Financial Planning

Defined districts and franchise zones enable better data collection and analysis for informed financial decisions and optimized resource allocation. A regular performance monitoring ensures efficient use of financial resources and allows for cost-sharing arrangements, resulting in reduction of capital expenditures and operational costs. Additionally, long-term contracts with fixed rates offer cost predictability, which helps with budgeting and financial planning.

3.3 CONCLUSION

Aligning collection agreements among the 29 ILA members and establishing districts and franchise zones within the ILA Authority can lead to significant financial benefits for the Authority. By consolidating services, municipalities can achieve cost savings through shared resources and centralized operations, while competitive bidding drives down service costs. Consistent rates and fees provide predictable expenses, aiding in effective budgeting. Investments in modern infrastructure, such as recycling centers, improve processing efficiency and generate revenue from recyclables. Retaining public ownership ensures that savings and revenues are reinvested into the community. Additionally, defined districts enable better financial planning, data collection, and performance monitoring, enhancing the overall efficiency and sustainability of waste management and recycling efforts.

4.0 UNDERSTANDING THE SYSTEM MASS BALANCE

The Authority-wide mass balance model was developed to estimate the generation rates, composition, and routing of solid waste and source-separated recyclables from ILA (Interlocal Agreement) member municipalities to diversion and disposal facilities in Broward County. The model aims to provide a comprehensive understanding of the current solid waste system and to forecast future needs, ensuring that all waste is accounted for and managed efficiently.

4.1 METHODOLOGY

The methodology for the mass balance model begins with estimating population and waste generation rates. Population estimates are derived from the U.S. Census Bureau data and projected using the 2023 Broward County and Municipal Population Forecast and Allocation Model (PFAM). These projections are adjusted manually for each ILA member to match the PFAM values as closely as possible. Waste generation rates are calculated using data from the Florida Department of Environmental Protection (FDEP) reports, which include total population and the tons of single-family, multi-family, and commercial MSW collected. The per capita waste generation rate is then used to estimate the total waste generated per year, with projections based on trendlines of past growth rates.

Waste composition is categorized into four fractions: Source-Separated recyclables (SSR), Residential MSW (RMSW), Commercial MSW (CMSW), and Construction and Demolition Debris and WG (C&D/WG). The composition percentages for each waste fraction are calculated based on access to and participation in recycling programs. Access is determined by the availability of residential curbside recycling service and requirements for commercial recycling, while participation is estimated using assumed setout rates for different property types. The resulting recycling tons are divided by the total tons for each ILA member to determine the waste fraction percentages.

The model then reviews collection contracts to determine the routing of collected waste to transfer stations or diversion/disposal facilities. The collected waste tonnage, separated by material type, is routed to either a transfer station or a diversion/disposal facility. The model calculates the tonnage routed to each facility and compares it to the facility's permitted capacity. When facilities approach capacity limits, the model highlights the need for new facilities. Waste received at transfer and

processing facilities is further routed to receiving facilities such as landfills, recycling markets, or other end users, ensuring that all waste is accounted for and managed efficiently.

4.2 CONSTRUCTION AND DEMOLITION DEBRIS/WG MANAGEMENT OPPORTUNITIES

4.2.1 Background

Construction and Demolition Waste and WG (C&D/WG) include waste from construction and demolition activities such as wood, concrete, metal, drywall, bricks, asphalt, and glass as well as Bulk Waste such as furniture and appliances. The current (i.e., 2023) waste composition applied to each of the ILA communities shows that approximately 42% of the total waste is comprised of C&D/WG, which translates to approximately 1.72 million tons of C&D/WG waste annually that has the potential to be properly managed, processed, and recycled. **Figure 4** presents the percent breakdown of waste compositions by single stream recycling (SSR), residential MSW (RMSW), commercial MSW (CMSW), and C&D/BW for each ILA communities. However, it should be noted that C&D is managed primarily by the private sector. Only four ILA member communities indicated that they provide C&D collection services. While communities provide BW collection services, this makes up less than 0.20% of the total waste tonnages and as reported by FDEP in 2023 (the most current year available), Broward County recycled 79% of the WG collected. Overall, Broward County recycled 39% of C&D in 2023. The goal of this recommendation is to consider the potential cost savings or potential additional costs associated with providing collection services to recycle C&D waste.

Figure 4. ILA Member Community Waste Composition Estimates (2023)

ILA Member Waste Composition Comparison

ILA Member	Tons	SSR	RMSW	CMSW	C&D/BW
Broward Municipal Services District	44,665	4.96%	19.87%	28.19%	46.98%
Coconut Creek	145,154	3.94%	12.37%	31.76%	51.93%
Cooper City	83,535	5.35%	22.79%	26.80%	45.06%
Coral Springs	333,797	4.17%	14.06%	30.95%	50.81%
Dania Beach	87,224	4.29%	14.93%	30.54%	50.24%
Davie	266,330	4.29%	14.90%	30.55%	50.26%
Deerfield Beach	217,355	3.92%	12.18%	31.85%	52.05%
Fort Lauderdale	492,869	2.06%	18.88%	29.82%	49.24%
Hillsboro Beach	4,972	2.70%	3.14%	36.15%	58.01%
Hollywood	388,019	4.45%	16.14%	29.97%	49.44%
Lauderdale Lakes	90,240	3.46%	8.77%	33.47%	54.30%
Lauderdale-by-the-Sea	16,073	3.19%	6.75%	34.43%	55.63%
Lauderhill	186,383	3.78%	11.12%	32.35%	52.75%
Lazy Lake	82	5.42%	23.29%	26.57%	44.73%
Lighthouse Point	25,425	5.04%	20.46%	27.91%	46.59%
Margate	147,067	4.55%	16.82%	29.64%	48.99%
Miramar	346,281	4.75%	18.37%	28.90%	47.97%
North Lauderdale	113,777	4.29%	14.95%	30.53%	50.23%
Oakland Park	113,460	4.45%	16.09%	29.99%	49.48%
Parkland	85,210	5.29%	22.32%	27.03%	45.37%
Pembroke Park	15,556	3.45%	8.69%	33.51%	54.35%
Plantation	228,680	4.54%	16.75%	29.68%	49.04%
Sea Ranch Lakes	1,550	4.83%	18.91%	28.65%	47.62%
Southwest Ranches	20,936	5.13%	21.16%	27.58%	46.13%
Sunrise	243,691	4.11%	13.57%	31.19%	51.13%
Tamarac	180,453	4.31%	15.05%	30.48%	50.16%
West Park	38,164	5.28%	22.27%	27.05%	45.40%
Weston	168,450	4.66%	17.68%	29.23%	48.43%
Wilton Manors	30,693	3.84%	11.60%	32.12%	52.44%

Note: The highlighted ILA communities provide C&D collection.

The projected waste generation is based on estimated population and the distribution of residential properties and commercial establishment in each municipality. Waste composition is based on the results in Broward County 2023 Waste Characterization Study Final Report[2]. The details of the mass balance can be found in Task 2 White Paper: Evaluate Existing Solid Waste Disposal and Recycling Processes and Resources.

[2] https://browardleague.org/wp-content/uploads/2024/06/Broward-County-Waste-Composition-Study-Final-Report-0524.pdf

4.2.2 Use of Mass Balance

Utilizing the tonnages tracked in the mass balance model and the local C&D disposal and recycling facilities, such as costs per ton and per cubic yard there is an opportunity to develop a model for analysis of C&D within Broward County. These common recyclable C&D waste stream components, which are presented below in **Figure 5**, are accounted for within the mass balance model.

Figure 5. Commonly Recycled Construction and Demolition Debris Components

Commonly Recycled C&D Waste

Material Type	Tons
Ferrous Metals	8,595
Wood	420,286
Asphalt/Brick/Concrete	316,289
Asphalt Roofing	441,773
Drywall	125,484
Rock	48,131
Corrugated Cardboard	37,817

While the above is not a comprehensive list of C&D waste streams that the mass balance model tracks, it makes up about 81.35% of the C&D/WG waste collected in Broward County. Furthermore, with the exception of drywall, the listed material types are 100% recyclable.

4.2.3 Conducting a Pilot Program

In partnership with cities such as Deerfield Beach, who already provides C&D collection services, other cities may implement a pilot C&D waste collection and recycling program. This will help assess feasibility and gather data on costs and benefits. This initiative may also open opportunities to partner with private waste management companies and recycling facilities to leverage their expertise and infrastructure. In doing so, the cities may be able to secure better processing fees with these facilities. Additionally, cities can involve local businesses, construction companies, and community organizations in the planning and implementation process and work in unison towards reaching a favorable C&D recycling rate in Broward County. As an alternate pathway to maximizing C&D/WG recycling, the SCS Team has been tasked with preparing a C&D management options white paper that explores opportunities to enact legislation at the County-level to mandate C&D recycling by placing restrictions on C&D disposal.

4.2.3.1 Expenses and Revenue Considerations

If ILA communities were to consider providing collection services for C&D/WG, there would be a number of cost considerations.

4.2.3.2 Operational Costs

Depending on the current collection level of the city, there would be additional expenses related to providing C&D collections such as vehicles, labor, and other operational costs. For instance, if Coral Springs were to double its C&D collection limit to four (4) CY, it implies that there may be twice as many trips to recycling facilities, resulting in increased collection costs. If recycling facilities are not centrally located, transportation costs may increase due to longer hauling distances. Therefore, each municipality should consider the expenses related to collecting and transporting C&D waste such as fuel, vehicle maintenance, and labor costs for drivers based on the C&D waste generation and collection needs. Other labor costs would largely occur in collecting and sorting the waste. Currently, Fort Lauderdale is estimated to have generated the highest C&D/WG waste at approximately 201,000 tons in 2023. Hollywood, Coral Springs, Miramar, Sunrise, Davie, Deerfield Beach, and Plantation followed with an average of approximately 122,000 tons of C&D/WG waste. In these municipalities where large amounts of C&D waste are generated, there may be additional labor costs associated with administration to track on-going large construction and demolition projects. Additionally, cities may need to invest in containers or dumpsters for their users.

4.2.3.3 Disposal and Recycling Costs

Since our data on landfill tipping fees and processing fees at recycling facilities is limited, each ILA community would need to consider per ton fee at recycling facilities to process C&D waste based on existing tonnage data. Based on our data, both Reuters Recycling Facility and WM Recycling Oakes Road provided C&D recycling services at a cheaper rate than landfilling it. The cost to recycle per ton at these facilities are $68 and $85, respectively. The cost to dispose of C&D waste at the Broward County Landfill is $100. It is important to note that this is a gate rate and there may be discrepancies in the actual tipping fees.

4.2.3.4 Revenue Opportunities

Based on the costs related to providing services, cities may develop a user charge to offset the expenses. The cost to collect and haul to waste facility can be calculated, depending on the container and dumpster size. These costs can be determined based on industry experience and local rates obtained from waste haulers in Broward County or cities that provide collection services.

4.2.4 Investing in Infrastructure

With the push towards recycling more C&D/WG waste, an increase in volume at existing facilities can be expected. These facilities have a range of permitted tonnage from less than 200 tons per day to more than 5,000 tons per day. The low C&D/WG recycling rate implies that a significant amount of C&D waste is landfilled. It would be important to gauge the current capacity at the processing facilities to ensure that the increased C&D/WG tonnage can be processed and managed properly. There may also be benefits to investing in infrastructure that is strategically located to minimize transportation costs and to generate revenue from recyclable materials. Investing in modern recycling centers and MRFs may be beneficial in managing the potential increase in volume C&D waste.

4.3 CONCLUSION

The mass balance model provides a detailed and dynamic tool for understanding and managing the waste generated and managed via the Authority's future solid waste system. By accurately estimating waste generation, composition, and routing, the model helps identify current and future needs, ensuring that waste management practices are efficient and sustainable. Based on the current data, the potential benefits of focusing on C&D/WG are significant. With approximately 42% of the total waste in Broward County comprised of C&D/WG, there is a substantial opportunity to improve recycling rates and reduce landfill usage. Implementing a pilot program with cities that already collect C&D waste can help assess feasibility and gather data on costs and benefits. Through this, municipalities can consider the costs and revenue opportunities and develop user charges to offset expenses. Furthermore, ILA communities can unify efforts to invest in recycling facilities and optimize operations to lead to cost savings and revenue generations from recyclables.

The model's ability to highlight capacity issues and forecast the timeline for new facilities is crucial for long-term planning and resource allocation. This comprehensive approach supports the development of a Regional Solid Waste and Recycling Master Plan, which will serve as the foundation for the future of the Authority.

5.0 BUDGETING

Government budgeting is the process by which public authorities allocate financial resources to meet societal needs, execute policies, and achieve economic objectives. It involves forecasting revenues, estimating expenditures, and aligning spending priorities to deliver public services efficiently and equitably. The budget serves as a key policy document, reflecting a government's fiscal strategy and priorities for a specific period, typically a fiscal year.

5.1 PURPOSE OF GOVERNMENT BUDGETING

The primary purpose of government budgeting is to allocate resources efficiently to address public needs while maintaining fiscal responsibility. Governments use budgets to fund essential services such as education, healthcare, infrastructure, and public safety. Strategic investments outlined in budgets can promote economic stability and growth by stimulating economic activity or addressing structural challenges. A well-prepared budget also helps manage public debt, ensuring that fiscal policies remain sustainable over the long term. Furthermore, government budgets provide a mechanism for transparency and accountability, enabling taxpayers and stakeholders to understand how public funds are being utilized. They also serve as tools to achieve specific policy goals, such as reducing inequality or tackling environmental issues.

5.2 COMPONENTS OF A GOVERNMENT BUDGET

A government budget typically comprises two main components: revenues and expenditures. Revenues are the income generated by the government to fund its operations. The primary sources of revenue include taxes, such as income, sales, property, and corporate taxes, which form the bulk of public income. Additionally, non-tax revenues, such as fees, fines, and revenues from public enterprises, contribute to the government's income. In certain cases, borrowing and grants from international organizations or other governments supplement these revenues.

Expenditures, on the other hand, represent the government's spending on various needs and projects. These are broadly classified into operating expenditures and capital expenditures. Operating expenditures cover the day-to-day costs of government operations, including salaries, utilities, and routine maintenance. In contrast, capital expenditures involve investments in long-term infrastructure projects, such as roads, bridges, schools, and hospitals, which have enduring benefits for the economy and society.

5.3 THE BUDGETING PROCESS

The government budgeting process is typically organized into several key steps. The first step is planning and proposal, during which individual government agencies assess their needs and submit funding requests aligned with their goals and objectives. These requests are reviewed by a central authority, such as the finance or budget department, to ensure alignment with broader fiscal strategies.

Once the proposals are consolidated, the budget is submitted to the legislative body for approval. During this phase, the proposed budget undergoes debates and potential modifications to address concerns and priorities raised by legislators. After obtaining legislative approval, the budget moves to the implementation phase. At this stage, funds are allocated to the relevant departments and programs, and agencies begin executing their operations and projects as per the budget plan.

The final step in the process is monitoring and evaluation. This involves tracking expenditures and ensuring that funds are used efficiently to meet the intended objectives. Audits and performance evaluations are conducted to maintain accountability and to identify any areas for improvement in future budgets.

5.4 TYPES OF BUDGETS

Governments use different types of budgets depending on their fiscal strategies and objectives. A balanced budget occurs when revenues are equal to expenditures, avoiding deficits and ensuring financial stability. A surplus budget, where revenues exceed expenditures, allows governments to save funds or reduce public debt, often reflecting a conservative fiscal approach. In contrast, a deficit budget occurs when expenditures surpass revenues, requiring borrowing to cover the shortfall. Deficit budgets are often used to stimulate economic activity during recessions or to address urgent needs, though they must be managed carefully to avoid unsustainable debt levels.

5.5 CHALLENGES IN GOVERNMENT BUDGETING

Government budgeting faces several challenges that complicate the process. Revenue volatility is a significant issue, particularly for governments that rely heavily on fluctuating sources of income such as taxes on natural resources or trade. This unpredictability can disrupt fiscal planning and necessitate frequent adjustments. Another challenge is managing rising public debt, as governments must balance the need for critical expenditures with the imperative to keep borrowing at sustainable levels.

Allocating limited resources among competing priorities is inherently challenging, as governments must make difficult decisions about which programs and services to fund. Political influence can also complicate budgeting, as decisions may be shaped by political agendas rather than objective

assessments of public needs. Additionally, economic uncertainty, such as inflation, unemployment, or global market fluctuations, can affect both revenue forecasts and expenditure requirements, making accurate budgeting more difficult.

5.6 TRENDS IN MODERN GOVERNMENT BUDGETING

Modern governments are increasingly adopting innovative practices to enhance the efficiency, transparency, and effectiveness of budgeting. Performance-based budgeting is one such approach, where funding allocations are tied to measurable outcomes and results, ensuring that resources are directed toward programs that demonstrate impact. Participatory budgeting is another trend, involving citizens in the decision-making process to improve accountability and align spending with community priorities.

Technology is also playing a transformative role in government budgeting. Data analytics and digital platforms are being used for forecasting, tracking expenditures, and reporting, which improves accuracy and accountability. Many governments are also focusing on sustainability, allocating funds to initiatives that address environmental challenges such as renewable energy projects, climate resilience, and conservation programs. These trends reflect an effort to make government budgeting more responsive to contemporary needs and expectations.

5.7 ZERO-BASED BUDGETING FOR A SOLID WASTE AUTHORITY

Zero-Based Budgeting (ZBB) is a financial planning approach that begins each budgeting cycle from a "zero base," with no presumption that past expenditures will continue. Every cost must be justified based on its necessity and contribution to specific goals. For a solid waste authority planning to construct, finance, and operate new facilities while maintaining existing operations, ZBB offers a robust framework to align expenditures with priorities. This budgeting method ensures that resources are allocated efficiently to support the authority's mission of sustainable and cost-effective waste management. This report explores how ZBB can be applied to anticipate cost increases as facilities are built, staffed, and operated, while also enabling strategic financial planning for the authority's future.

5.7.1 Understanding Zero-Based Budgeting

Zero-Based Budgeting requires a fresh assessment of all expenditures for each budget cycle. Unlike traditional budgeting, which adjusts prior budgets incrementally, ZBB evaluates every line item from scratch. For a solid waste authority, this approach enables granular analysis of costs associated with facility construction, staffing, operations, and maintenance. This ensures that every expense directly supports operational objectives and helps avoid unnecessary spending. The method is particularly useful in situations involving significant changes in operations, such as constructing and operating new facilities, where past spending patterns may not provide an adequate foundation for planning.

5.7.2 Cost Increases in Facility Development and Operations

The costs for a solid waste authority will increase progressively through distinct phases of facility development and operations. During the planning and construction phase, initial expenditures will include land acquisition, permitting, architectural design, engineering, and construction. These

capital costs are often substantial and require careful budgeting and phasing to align with available resources and timelines. Additionally, financing costs such as bond issuance fees, interest payments, or loan servicing must be incorporated into the budget.

In the pre-operational phase, once construction is complete, costs will shift toward equipping the facility with the necessary machinery, tools, and safety systems. This phase will also involve recruiting and training staff to ensure that the facility is prepared for full operations. These pre-operational costs often represent a transitional period of spending that bridges capital investments with ongoing operational expenditures.

When the facility becomes operational, recurring costs will dominate the budget. These include salaries and benefits for employees, utility expenses, maintenance of equipment, and waste processing activities. Compliance-related expenses, such as environmental monitoring and reporting, will also be necessary to meet regulatory standards. As the facility scales its operations or adapts to increased demand, additional costs may emerge, requiring the authority to reassess its revenue sources and funding strategies.

Finally, as demand for waste management services grows, the authority may need to expand its facilities or enhance its services, further increasing costs. This could involve purchasing additional equipment, hiring more staff, or upgrading technology to improve efficiency. Recognizing these incremental cost increases and planning for them in advance is critical to maintaining financial stability.

5.7.3 Applying Zero-Based Budgeting to Anticipate Costs

The application of ZBB to the solid waste authority's budget begins with defining clear objectives and priorities. The authority must articulate its goals, such as increasing waste processing capacity, achieving compliance with environmental regulations, and maintaining financial sustainability. These objectives provide the foundation for evaluating and justifying each expense.

To anticipate and manage costs effectively, the authority must identify cost drivers specific to facility construction and operations. For example, construction costs might be influenced by material prices, contractor fees, or regulatory requirements. Similarly, operational costs will depend on factors such as staffing levels, energy consumption, and waste processing volume. By analyzing these drivers, the authority can create detailed cost estimates for each phase of facility development and operation.

Building cost scenarios is another essential aspect of applying ZBB. This involves developing comprehensive budgets for various operational scenarios, including best-case, worst-case, and most-likely projections. These scenarios enable the authority to prepare for uncertainties and make informed decisions about resource allocation. Each expense in these scenarios must be justified, ensuring that spending aligns with the authority’s strategic goals.

As new facilities are built and become operational, the authority can use a phased approach to budget for incremental cost increases. This involves forecasting how each facility’s construction and operation will impact the overall budget and aligning funding requirements with these changes. Revenue sources such as tipping fees, recycling income, and government grants must be evaluated to ensure they are sufficient to cover projected expenses.

5.7.4 Planning for Long-Term Sustainability

Long-term financial sustainability requires the solid waste authority to adopt proactive strategies for revenue generation and cost control. By implementing ZBB, the authority can identify inefficiencies and eliminate unnecessary expenditures, freeing up resources for critical priorities. For instance, evaluating the cost-effectiveness of waste processing technologies or staffing models can help optimize operations and reduce expenses.

Performance metrics should also be integrated into the ZBB framework to evaluate the effectiveness of spending. Metrics such as the cost per ton of waste processed, energy efficiency of facilities, and employee productivity provide valuable insights into operational efficiency. These metrics can guide future budget decisions and highlight areas for improvement.

Revenue diversification is another key aspect of long-term planning. The authority should explore opportunities to increase income through partnerships, grants, or the sale of byproducts such as recyclable materials or energy generated from waste. Additionally, maintaining a contingency fund can help mitigate the impact of unforeseen expenses or revenue shortfalls, ensuring financial resilience.

5.7.5 Revenue Sufficiency Analysis

A revenue sufficiency analysis (RSA) is a comprehensive evaluation used by utilities to determine whether their current and projected revenues are adequate to meet all financial obligations. These obligations typically include operating costs, capital expenditures, debt payments, and other financial commitments. The primary goal of this analysis is to ensure the organization's financial stability and its ability to sustain operations over the long term.

At its core, the analysis assesses the adequacy of current revenues. This involves evaluating historical revenue trends and projecting future revenues based on existing rates, customer behavior, usage patterns, and anticipated growth. By understanding how much revenue is being generated and how it may change over time, utilities can determine if they have enough income to cover their expenses. Simultaneously, the analysis involves a thorough review of costs, which includes operating expenses such as labor, materials, and maintenance. It also considers longer-term financial needs, such as capital improvement projects, infrastructure investments, debt service costs, and reserve requirements.

Once the revenues and costs are analyzed, the utility can compare these figures to identify financial gaps. These gaps may represent revenue shortfalls that could impede operations, or funding surpluses that might allow for system investment or program expansion. To enhance the analysis, a scenario analysis, or a "what-if" assessment is often utilized, which examines the potential impact of changes in various external and internal factors. For example, changes in demand, economic conditions, or regulatory requirements can significantly influence both revenues and expenses. This "what-if" analysis helps test your financial sensitivity to the unknown, allowing you to be prepared to respond effectively.

The RSA typically concludes with recommendations for addressing identified gaps. These might include strategies such as a long-term plan for adjusting rates, implementing revenue diversification or optimization solutions, or exploring alternative funding sources.

Regular RSA updates help utilities maintain financial stability by proactively addressing potential shortfalls before they become critical issues. Additionally, the process provides a data-driven foundation for decision-making, ensuring that changes to rates, fees, and/or budgets are transparent and justifiable. For stakeholders and the public, the analysis demonstrates fiscal responsibility and a commitment to long-term sustainability.

5.8 PROCESS

The Revenue Sufficiency Model can be used to create a multi-year projection of the authority's current rate revenues to determine whether the level of existing revenues can meet the projected financial requirements during each year of the projection period. The Model then can be used to calculate the level of revenue adjustments required for the fund to meet its revenue requirements. It replicates the cash flows of the authority in each year of the projection period, based upon authority's policies and available fund balances. In each year, the model utilizes unrestricted fund balances, revenues, and capital funds to pay for any operating or capital expenditures in that year. To the extent necessary to fund all the projects and vehicle/equipment replacements in the capital program, the model can identify the level of borrowing and the resulting debt service payments that would be required.

It is important to note that the ILA provides the power to impose, levy, and collect special assessments in order to finance the acquisition, construction, maintenance, operations, and other capital necessary to provide solid waste and recycling services to ILA members. The Authority may also utilize funds collected through special assessments to pay principal and interest on bonds issued to fund the implementation of the Authority's facilities.

After loading the Model and calibrating it to the Authority's financial dynamics, interactive meetings can be facilitated with Authority staff to review the data and preliminary results. During these meetings, assumptions can also be reviewed to assess the impact of changes in the analysis, such as working capital reserve targets, interest earnings on fund balances, assumed term and rate for future borrowing, future development that may affect customer growth, policies or regulatory requirements that may affect capital spending, operating cost escalation rates, etc.

Once the model is refined, sensitivity testing of the model outcomes to changes in various variables can be assessed to then inform the financial management plan and the associated annual rate adjustments that would allow the fund to meet its cost requirements while attaining its strategic goals and financial performance objectives.

5.9 CONCLUSION

Zero-Based Budgeting offers a practical and transparent approach for the Authority to manage the financial complexities of building and operating new facilities. By justifying every expense and aligning spending with strategic goals, ZBB will enable the Authority to anticipate and plan for cost increases while maintaining financial sustainability. When combined with long-term forecasting and performance monitoring, ZBB can ensure that the authority remains agile and effective in delivering waste management services to meet the needs of the community.

Appendix I

Task 4 White Paper – Future Needs Assessment

Solid Waste Authority of Broward County, Florida

Task 4 White Paper: Future Needs Assessment

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1.0 INTRODUCTION

To inform the assessment of future solid waste system needs, an analysis was conducted of Broward County's projected population growth and associated waste generation rates. This analysis is based on population and solid waste material generation estimates at 5-, 10-, 20-, 30-, 40-, and 50-year intervals, using 2023 as the baseline to align with waste management data used by the Florida Department of Environmental Protection (FDEP). Recognizing the significant role of curbside recycling programs in achieving the waste diversion goals of the Solid Waste Authority of Broward County (Authority), the SCS Team performed a detailed evaluation of Single-Stream Recycling (SSR) versus Dual-Stream Recycling (DSR) systems. The findings, included in **Appendix A**, support a recommendation to maintain and expand Single-Stream (SS) collection systems.

Based on this foundational information, five (5) scenarios were developed to offer detailed options for meeting the future solid waste and recovered materials processing capacity necessary to achieve Florida and the Authority's 75% waste diversion goal by 2045. In addition, the SCS Team was guided by the Authority's guiding principle to "control their solid waste management destiny."

Each scenario incorporates a combination of advanced processing technologies, supporting infrastructure such as transfer stations to optimize waste transportation, as well as policy recommendations that have demonstrated effectiveness in other municipalities. These policy measures aim to influence community disposal behaviors and maximize materials recovery, aligning with the Authority's long-term waste diversion objectives. For each scenario, the analysis includes estimates of the type and number of required waste processing facilities, associated waste volumes, implementation timelines, detailed cost projections, and anticipated waste diversion rates. **Appendix B** details the associated collection costs for each scenario.

Additionally, the SCS Team assessed the planning scenarios through an environmental justice framework to evaluate potential community impacts associated with each solid waste management technology. The U.S. Environmental Protection Agency's Waste Reduction Model (WARM) was utilized to estimate Greenhouse Gas (GHG) emissions reductions achievable through various waste management practices. Cultural and political considerations were also examined to evaluate the feasibility and likelihood of successful implementation for each strategy.

The assessment of processing technologies, policies, and scenarios concludes that Scenario C is the most likely to achieve the Authority's waste diversion goals. However, this analysis is the initial step in facilitating further collaboration amongst the Authority, the SCS Team, decision-makers, and the public. A thorough evaluation of the trade-offs associated with each scenario is essential to refine the Solid Waste Master Plan, which will ultimately chart the recommended path toward achieving the Authority's 75% waste diversion goal by 2045.

2.0 WASTE GENERATION MODEL

The SCS Team developed a Solid Waste Mass Balance model (SWMB or Model) as part of Task 2 of the Regional Solid Waste and Recycling Master Plan project. This model estimates the tonnage of solid waste and recyclable materials generated within the County using publicly available data and information provided by Authority members and municipalities. The Model tracks the flow of waste through the Authority's solid waste system and out-of-County disposal facilities, encompassing four (4) key phases: **Generation, Collection, Transfer/Routing, and Diversion/Disposal.**

The Model projects waste flow by type and quantity from a 2020 baseline through 2070 (Planning Horizon), incorporating factors such as population growth and other variables influencing the Authority's waste management planning. For each phase, the model calculates the total tonnage and material-specific breakdown of the waste stream for both Interlocal Agreement (ILA member) and non-member municipalities. Using population growth and publicly available generation rates, the Model balances the total tonnage across the four (4) phases to ensure all waste is accounted for. After verifying the mass balance, the model advances year by year, incorporating growth rates and other factors allowing prediction of when receiving facilities will reach capacity and require expansion, or when rerouting of waste to alternative sites will be required.

The SWMB serves as the foundation for the modeling that was used to develop the Task 4 White Paper and is the most reliable available dataset. Key characteristics of the Model include:

- **Population Estimates:** Calculations are based on population data for each municipality starting in 2020, derived from U.S. Census Bureau data and the 2023 Broward County and Municipal Population Forecast and Allocation Model (PFAM).

- **Tonnage Calculations:** County data from the FDEP reports on Municipal Solid Waste (MSW) tonnage collected in 2023 calibrates generation rates for single-family, multi-family, and commercial waste. Construction and Demolition (C&D) debris and bulk waste (BW) tonnage are calculated as the residual after accounting for other waste streams.

- **Waste Generation and Waste Composition Studies:** Waste generation and composition was estimated utilizing County-wide data provided in the FDEP reports titled *2020 MSW Collected and Recycled by Generator Type By Descending Population* and *2020 Total Tons of MSW Materials Collected and Recycled In Florida*. This data included total population (as reported by the US Census Bureau) and the total tons of single-family, multi-family, and commercial MSW collected. Waste composition was based on the results in the Broward County 2023 Waste Characterization Study Final Report

- **Data Validation:** Published FDEP reports were cross-referenced to validate the data.

- **Waste Transfer and Routing:** Transfer and routing processes are based on ILA-member provided data as well as a review of ILA member collection contracts.

Using the SWMB, the SCS Team developed and modeled scenarios (Scenario Model), which are presented in Section 4.0, to enhance waste diversion and disposal, with the goal of achieving a 75% or higher recycling rate. The Scenario Model also forecasts future waste management facility needs. Based on these findings, scenario recommendations for optimizing the Authority's materials management system were developed and are presented in Section 4 of this White Paper.

3.0 COMPARISON OF SINGLE-STREAM VS. DUAL-STREAM RECYCLING SYSTEMS

As part of this Task 4, the SCS Team conducted an evaluation of SSR and DSR systems, the two most widely implemented methods for collecting household and commercial recyclables. SSR has emerged as the predominant method across Florida and the United States, utilized by over 96% of municipalities based on the quantity of materials recycled and the population served. Nevertheless, Dual-Stream (DS) recycling systems remain in operation, including in Palm Beach County, an adjacent and demographically comparable county to the north of Broward County.

SS systems are generally preferred due to their cost-efficiency, GHG emission savings, potential for higher diversion rates, and improved safety for collection personnel. Automated collection vehicles, typically used in SS systems, enhance driver safety compared to the manual collection vehicles often associated with DS systems. Moreover, SSR is highly favored by residents due to its convenience and lower costs. Notably, fewer than 0.5% of programs in North America revert to DS collection after transitioning to SS systems.

On the other hand, DS systems, such as the one implemented in Palm Beach County, are often commended by local solid waste managers for producing higher-quality recyclables. These systems achieve significantly lower contamination rates in incoming materials compared to SS systems. Palm Beach County's DS program, which is directly managed by the Solid Waste Authority of Palm Beach County (SWA), includes recyclable commodity marketing as part of its operations. This program is frequently cited as a model for effective recycling by advocates of DS systems, highlighting the benefits of its lower contamination rates and well-managed processes.

The SCS Team conducted a comprehensive analysis, detailed in **Appendix A**, which incorporates the latest research on both systems in U.S. municipalities. The analysis focuses on several critical factors, including:

- Functionality of recycling and materials processing facilities,
- Impact on collection system truck usage,
- Effect on operational efficiency and costs, and
- Influence on diversion rates due to changes in participation.

3.1 COMPARISON TO PALM BEACH COUNTY

For a direct and meaningful comparison, the SCS Team evaluated Broward County's extensive SS programs against Palm Beach County's DS system. **Table 1** provides a detailed comparison of the two systems based on Broward-specific data. [1]

[1] Other Dual-Stream programs of sufficient scale including Montgomery County, MD, Marin County, CA, and those in and around New York City (including Long Island) were also studied but were sufficiently different from Florida's DS operations (e.g., Palm Beach County)

Table 1. Broward County Single-Stream Recycling System Compared to SWA Dual-Stream Recycling System

Point of Comparison		Broward County SS	Palm Beach County DS
Qualitative	Quantitative		
Collection Cost Efficiency	Collection cost per ton (per unit per year) • Labor • Transportation/ Equipment	$162/ton ($71/ unit)[2] 0.4 tons/ unit per year • Higher collection efficiency • Lower collection $/ton	$406/ton ($130/ unit)[3] 0.3 tons/ unit per year • Lower collection efficiency, • Higher collection $/ton
Processing (Sorting) Cost Efficiency	RMPF[4] sorting cost per ton • Initial investment • Cleaning and maintenance costs • Disposal costs	$106/ton[5] • Lower sorting efficiency and quality • Higher sorting $/Ton	$71/ton[6] • Higher sorting efficiency and quality • Lower sorting $/Ton
Participation rate/ Diversion rate	• Households in program / total households • Collected for recycling/ Waste disposed	SS may be perceived and has historically had higher participation rates compared to DS, but studies are largely inconclusive on the impact of factors like socio demographics, outreach and education, frequency of collection and container types, which all impact performance. Historical comparisons between counties specifically based in Florida are not conclusive in these areas either (Byars, 2012).	
Contamination rate	Waste disposed by sorting facility/ waste received by sorting facility	According to a study of RMPFs in Florida, DS RMPFs reported lower, on average, contamination rates in terms of inbound tonnage landfilled (18%) compared to SS RMPFs (27%). However, it is worth noting rates reported by individual SS RMPFs varied (ranging from 14% to 57%) (Townsend and Anshassi, 2020).[7]	
Est. Overall collection + processing cost based on research	**Cost per ton**	**$268/ton**	**$477/ton**

[2] Based on data provided by the Authority.
[3] Based on FY 2020 Curbside recycling Collection (385.57) + Transfer rate (29.89) (Solid Waste Authority of Palm Beach County, 2022).
[4] The term "Material Recovery Facility" (MRF) is often used interchangeably with "Recovered Materials Processing Facility" (RMPF). For permitting purposes, FDEP categorizes these facilities as a RMPF.
[5] Based on data provided by the Authority.
[6] Based on Figure 10: RMPF Throughput, Revenue and Expenses (not inclusive of recycling programs administration) (Solid Waste Authority of Palm Beach County, 2022).
[7] City of Seattle also reports that 2020 recycling composition hand sorts show contamination rates of ~11% (Cascadia Consulting Group, 2022).

The analysis highlights key trade-offs between SS and DS recycling systems. SSR offers lower collection costs but is associated with higher processing expenses and reduced material quality. Conversely, DSR entails higher collection costs but benefits from lower processing expenses and improved material quality.

Historical data since the inception of SSR demonstrates that total recovery of recyclables tends to increase due to higher participation rates and reduced effort for residents, such as simplified storage and the elimination of household sorting.

Despite these trade-offs, a cost analysis of combined collection and processing reveals that the current SSR program is more cost-effective based on the available data.

3.2 RECOMMENDATION ON CURBSIDE RECYCLING COLLECTION

The SCS Team recommends that the Authority retain its current SSR program due to the significant direct cost savings compared to a DSR system and other related net savings.

Contamination and material yield metrics for SSR can be significantly improved at a lower cost than transitioning to a DSR system by investing in the following initiatives:

1. **Uniformity Across Programs:** Establishing consistency in program design and operations.
2. **Targeted Educational Messaging:** Utilizing Community-Based Social Marketing (CBSM) techniques to effectively reach and influence diverse populations.
3. **Enhanced Enforcement:** Strengthening policies to reduce contamination and ensure compliance.

Some of the cost savings from maintaining a SSR system should be reinvested in critical areas, such as improved education programs and technological upgrades at RMPFs. These investments would enhance material quality, addressing the primary advantage typically associated with DSR systems.

The variability in contamination rates across SS RMPFs in Florida, and nationally, indicates that the Authority can maintain its SS recycling system while improving recovery quality and capture rates to levels comparable to DS systems. Case studies provide valuable insights:

- **DSR Systems:** Examples from Palm Beach County, FL, and Montgomery County, MD, demonstrate the ability of DS recycling systems to achieve higher material quality. However, these systems also incur additional education, administration, and enforcement costs.
- **Low-Contamination SSR Systems:** Outagamie County, WI, exemplifies a successful SSR program, consistently achieving contamination rates below 10% for over two (2) decades. This success is attributed to a robust and well-funded education program. Outagamie's RMPF, operational since 2009, further illustrates the capability of modern RMPF technologies to enhance material recovery.

WM's planned RMPF upgrades, scheduled for completion by 2025, provide a critical opportunity to implement technological and programmatic improvements. These advancements can help stabilize contamination rates and maximize the value of recovered materials. For instance, Seattle's residential SSR program demonstrated a low contamination rate of 11% in 2020 according to its

2020 recycling composition study, showcasing the effectiveness of combining modern infrastructure with targeted educational efforts (Cascadia Consulting Group 2022).

The recommendation to retain the SSR program also informs Section 4, which evaluates five scenarios for improving waste diversion. Cost savings associated with maintaining the SSR system and the transition costs of shifting to a DSR program are not detailed in this analysis. Transition costs would include sunk investments such as Broward's nearly two decades of SS education programs, haulers' investments in SS-compatible vehicles and carts, and costs avoided, such as purchasing additional vehicles or carts for a DSR system. Additionally, retaining the SSR program simplifies the logistics of potential new services proposed in some scenarios, such as curbside yard and food waste collection, by avoiding the complexity of managing multiple carts per household. The SCS team acknowledges however that technologies and markets may change. As such, it is recommended that the Authority revisits SSR vs DSR in the halfway point of the planning horizon (i.e., 10-15 years out).

4.0 FIVE SCENARIOS FOR PROCESSING CAPACITY AND NEEDS

To meet the Authority's solid waste management and processing capacity requirements over the next 20 years, the SCS Team developed five solid waste processing and management scenarios. These scenarios were informed by a comprehensive review of waste processing models implemented across North America and other developed nations, as detailed in Task 9.

4.1 MOST LIKELY OUTCOMES AND INSIGHTS FOR THE FIRST 20 YEARS

The scenarios were developed based on an analysis of comparable municipal solid waste systems, the Authority's geographic constraints, limited land availability, permitting processes at the local and state levels, and the anticipated regulatory framework for stricter segregation of waste streams at the source across residential, commercial, and industrial sectors.

These factors significantly limit the potential for solid waste diversion during the first 20 years of the planning horizon. Additionally, the integration of open market collection systems within the Authority presents challenges to full participation. The facilities required to process this waste are constrained, necessitating a practical and phased approach to planning. This involves focusing on immediate, achievable solutions for the initial 20-year period while projecting growth-related facility needs for subsequent decades.

4.2 KEY INSIGHTS FROM TASK 9

The analysis in Task 9 (Identify Innovative and Future Technologies) provided four (4) key insights into advanced waste processing technologies that have been incorporated into each scenario:

1. **Challenges of Advanced Waste Refining Technologies**

   Task 9 evaluated high-cost, high-risk, and largely unproven methods for refining mixed waste into outputs such as sugars, alcohols, and carbon products (e.g., pyrolysis, gasification, and Fischer-Tropsch hydrolysis). These technologies have faced issues including low recovery rates, operational inefficiencies, capital cost overruns, product inconsistencies, and frequent failures in North America. Similarly, efforts to develop residual fuels from organic solids, wood chips, or plastics have struggled to achieve sustainable operation in WTE systems. While advancements have been made, these methods remain less competitive compared to established approaches for solid waste diversion.

2. **Optimizing the Organic Fraction of Waste Streams**

   Proven methods such as composting, in-vessel aerobic systems, and Anaerobic Digestion (AD) offer the greatest potential for increasing diversion rates. These technologies are cost-effective, low-risk, and foundational to high-performance waste management strategies tailored to the Authority.

3. **Advances in Sorting Technology**

   Emerging sorting technologies significantly enhance the recovery of recyclables in Mixed Waste Processing (MWP) facilities. These include advanced automation systems, self-regulating motor controls, and material preparation techniques such as shredding and

resizing. New features like recyclable material recirculation, air/density separation, and advanced optical sorting (e.g., near-infrared, artificial intelligence (AI)-assisted, x-ray) improve recovery rates, particularly when paired with organic extraction processes.

4. **Planning Framework for Waste Management**

   Each scenario incorporates a planning framework that evaluates facilities needed to manage projected waste volumes and compositions. This framework is based on:

   a. Proven advanced technologies for high diversion rates.

   b. Best practices for waste reduction and reuse.

   c. Practical strategies tailored to the Authority's unique geographic and demographic profile, including its coastal location and interconnectivity with neighboring counties.

   d. Sustainable processing methods prioritizing operational efficiency and environmental stewardship.

4.3 ENVIRONMENTAL IMPACT, PUBLIC HEALTH IMPACT, AND ENVIRONMENTAL JUSTICE

When planning for future recycling and waste related processing and disposal facilities, there are potential environmental impacts to consider. Different types of facilities and technologies pose various levels of risk to public health and the environment, including potential impacts to air, surface water, groundwater, and soil quality. It is important to acknowledge that although waste processing facilities may have some environmental impacts where they are sited (e.g. increased truck traffic and associated emissions, etc.), these facilities can provide net positive overall environmental benefits to a community when looking across an entire waste management system. It is also important to note that most environmental impacts are thoroughly reviewed during the permitting process with each facility being required to adhere to all pertinent local, state, and federal regulations to obtain operating permits. The permitting process evaluates various environmental impacts while providing for a review framework that is data driven based on what is deemed to be an acceptable level of risk as established by local, state, and federal regulations.

Although a detailed analysis of all public health and environmental impacts for each waste diversion scenario is beyond the scope of this Task 4 White Paper - given that such impacts are often site-specific and facility-dependent - the SCS Team did evaluate the potential environmental justice implications of each scenario. This analysis emphasized equitable outcomes for all communities, particularly those historically affected by environmental challenges, in alignment with the Authority's equity and inclusivity goals. The SCS Team also utilized available industry tools to quantify GHG emissions as part of the environmental impact review.

To estimate environmental impacts, the EPA's WARM model was used to assess GHG emissions across various scenarios. The management of SSR, food waste and yard waste across the different scenarios were entered into the WARM. The impact of special recycling, reuse and diversion programs was not modeled as it does not vary across the different planning scenarios, although these programs are expected to deliver an additional benefit of between 20-30% GHG emissions reductions. The input assumptions to the WARM were adjusted to reflect the conditions of the Authority. Details of the assumptions, inputs and output summary of the WARM model are provided in **Appendix D**.

4.4 INTEGRATION OF WASTE REDUCTION AND DIVERSION STRATEGIES

Each scenario incorporates actionable strategies to promote waste reduction, reuse, and recycling. Recommendations include:

- Policy initiatives to encourage waste diversion.
- Educational programs and outreach efforts to enhance public participation.
- Operational improvements to support increased diversion rates.

Detailed recommendations for implementing these strategies are presented in Section 7 of this White Paper.

The five scenarios that follow provide a comprehensive framework for shaping the Authority's sustainable waste management strategy over the next 40 years. This plan balances practicality, innovation, and inclusivity, to prepare the Authority to meet its long-term solid waste management challenges.

4.4.1 Scenario Overview and Key Assumptions

Following a comprehensive analysis of Broward County's current waste composition, generation patterns, and existing infrastructure, the SCS Team developed five scenarios to evaluate strategies for improving waste diversion across residential and commercial sectors. Each scenario presents a unique approach to collection methods and identifies the types of facilities required to achieve its goals, however all five scenarios also share a few key assumptions listed below.

- The SSR system will be continued and expanded to those households not currently receiving curbside collection.
- The existing WTE capacity at the South Broward Resource Recovery Facility (RRF) will continue to be utilized.
- A new Authority owned landfill is included in each scenario to ensure adequate disposal capacity for residue, ash, and other system byproducts.
- All scenarios include the development of eight (8) recycling drop-off centers to increase recycling access to those that do not receive curbside recycling collection and to host Household Hazardous Waste (HHW) and electronic waste collections.
- All scenarios include the development of two (2) C&D Recovery Facilities to enable increased recovery of construction and demolition related materials.
- All scenarios envision a robust and sustained education and outreach campaign to promote waste reduction, recycling correctly, and proper management of other waste streams (i.e. yard waste, HHW, electronic waste, etc.).

- All scenarios incorporate new policy initiatives, new technologies, and operational improvements to capture and recover materials as identified in Section 7 of this report.

- All scenarios include the building of three (3) transfer stations, in addition to the existing private transfer stations in the market, to be strategically located in the north, central, and southern portions of the County to support efficient material flow in the system.

All scenarios are anchored by the recommendation to retain a SSR system, as detailed in Section 3 and **Appendix A**, rather than transitioning to a DS model. The associated costs for collection and facility development under each scenario are outlined in Sections 4 and 5, respectively.

Critical "soft costs," including enhanced regulations, public communication, education, and stakeholder collaboration, are assumed as foundational elements in every scenario. These components, identified throughout the Plan as vital for the effective operation of the Authority, are integral to ensuring the success of the selected scenario(s). **Table 2** summarizes the proposed programs, facility requirements, and targeted diversion increases for each scenario.

The scenarios balance practicality with optimism, reflecting the feasible development of facilities within the County while maintaining optimal capacity at the lowest cost. Each scenario also considers the potential tonnage of waste that could realistically be processed, accounting for land use requirements and the availability of suitable sites for MSW processing.

Additionally, the scenarios are designed to elevate the Authority's non-WTE diversion capabilities to state-of-the-art levels without becoming cost-prohibitive in the long term. Transitioning to once-a-week MSW collection can offer significant cost savings and reduced environmental impacts associated with collection vehicle emissions and other quality of life impacts and is assumed in all scenarios except for Scenario D. Although there may be some cultural resistance to transitioning to once-a-week MSW collection, it can be phased in over time. As residents begin to become more familiar with waste reduction practices, local reuse opportunities, and increase their participation in recycling programs and proper disposal of HHW and electronic waste at drop-off centers, the volume of MSW placed in garbage carts is expected to decrease over time.

As the Authority's capacity grows and its waste management needs evolve, incremental adjustments to the number and size of facilities are anticipated to be feasible, ensuring flexibility and scalability in the implementation of the waste management strategy.

Table 2. Proposed Program Components by Scenario for Countywide with Likely Successful Outcomes Next 20 Years

Scenario	Programs	Additional Facility Needs and Capacity of Each Facility- Tons Per Year (TPY)	Target Diversion Rate Increase
A	• Reduce MSW 1x/week • Restore Recycling Services to 20% of Broward County • Add Curbside Yard Waste (YW) Collection • Add Food Waste (FW) Drop-Off Events • Add Permanent Household Hazardous Waste (HHW)/Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and diversion programs and policies as outlined in Section 7 of this White Paper.	• Two (2) Single- Stream Material Recovery Facilities (250,000 TPY each) • Two (2) New Organics Processing Sites with: Two (2) Mulch/ Colorizing Operations (175,000 TPY each) and One (1) New Biochar Pyrolysis operation (30,000k TPY) • Two (2) C&D Recovery Facilities (450,000 TPY each) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • One (1) Landfill	+25 percentage points to 62%
B	• Reduce MSW 1x/week • Restore Recycling Services to 20% of Broward County • Add Curbside Yard Waste (YW) Collection • Add Opt-In Curbside Food Waste (FW) Composting Collection • Add Permanent HHW/Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and diversion programs and policies as outlined in Section 7 of this White Paper. • Add new WTE capacity	• Two (2) Single Stream Material Recovery Facilities (250,000 TPY each) • Two (2) New Organics Processing Sites with: Two (2) (Mulch/ Colorizing) operations – (175,000 TPY), one (1) Covered Aerated Static Pile (CASP) composting operation (36,000 TPY FW + 37,000 TPY YW) And One (1) New Biochar Pyrolysis operation (30,000 TPY) • Two (2) C&D Recovery Facilities (450,000 TPY each) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • One (1) New WTE Facility (1M TPY) with Advanced Metals Recovery (AMR) • One (1) Landfill	+42 percentage points to 79%

Scenario	Programs	Additional Facility Needs and Capacity of Each Facility- Tons Per Year (TPY)	Target Diversion Rate Increase
C	• Reduce MSW 1x/week • Restore Recycling Services to 20% of Broward County • Add Curbside Co-Collection of Yard Waste (YW) and Food Waste (FW) for Composting • Add Permanent HHW/Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and diversion programs and policies as outlined in Section 7 of this White Paper. • Add new WTE capacity	• Two (2) Single Stream Material Recovery Facilities (250,000 TPY each) • Two (2) New Organics Processing Sites with: Ten (10) CASP composting operations (36,000 TPY FW + 37,000 TPY YW) each and One (1) Biochar Pyrolysis operation (30,000 TPY) • Two (2) C&D Recovery Facilities (450,000 TPY each) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • One (1) New WTE Facility (1M TPY) with AMR • One (1) Landfill	+46 percentage points to 83%
D	• Convert MSW (2x/week) to Wet MSW (2x/week) • Convert Recycling to Dry MSW (1x/week) • Add Curbside Yard Waste (YW) Collection • Add Permanent HHW/Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and relevant diversion programs and policies as outlined in Section 7 of this White Paper.	• Six (6) Dry Material Recovery Facilities (160,000 TPY each) • Three (3) New AD Organics Facilities for Wet Waste (160,000 TPY each) • Two (2) New Organics Processing Sites with: Two (2) (Mulch/ /Colorizing) operations (175,000 TPY each) and One (1) Biochar Pyrolysis operation (30,000 TPY) • Two (2) C&D Recovery Facilities (450,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • One (1) Landfill	+14 percentage points to 51%

Scenario	Programs	Additional Facility Needs and Capacity of Each Facility- Tons Per Year (TPY)	Target Diversion Rate Increase
E	• Reduce MSW to 1x/week • Restore Recycling Services to 20% of Broward County • Add Curbside Co-Collection of Yard Waste (YW) and Food Waste (FW) for Composting • Add Permanent HHW/Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and diversion programs and policies as outlined in Section 7 of this White Paper.	• Two (2) Single Stream Material Recovery Facilities (250,000 TPY each. • Two (2) New Organics Processing Sites with: Ten (10) CASP operations (36,000 TPY FW + 37,000 TPY YW) and One (1) Biochar Pyrolysis Facility (30,000 TPY) • Three (3) MWP Facilities (330,000 TPY each) with Single Stream Extraction, Fiber Extraction, and AD • Two (2) C&D Recovery Facilities (450,000 TPY each) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • One (1) Landfill	+36 percentage points to 73%

4.4.2 Scenario Screening Summary

Scenario screening criteria were developed to guide the relative trade-offs for the Authority, which are presented in **Table 3**. In addition to the facility risk matrix analysis for each facility type discussed in Section 9 of this White Paper, the scenarios were assessed using the following factors:

- **Cost:** Financial feasibility, including initial investments, ongoing maintenance expenses, and funding sources.
- **Diversion:** Amount of MSW diverted from landfills and WTE.
- **Cultural Barriers:** Societal acceptance and adaptability to changes introduced by the strategy.
- **Political Barriers:** Legislative and regulatory challenges, stakeholder support, and policy alignment.
- **Geographic Constraints:** Physical and environmental limitations that may impact implementation and sustainability.
- **Environmental Justice:** Ensuring equitable distribution of benefits and burdens across all communities, particularly marginalized or disadvantaged groups, while avoiding disproportionate negative impacts. Low means minimal negative impact on disadvantaged groups.

- **Likelihood of Success:** Assessing the probability of achieving desired outcomes based on resource availability, stakeholder cooperation, and potential risks or obstacles.

Table 3. Scenario Screening Criterion with Ratings

SCENARIO	COST	DIVERSION	CULTURAL	POLITICAL OR GEOGRAPHIC BARRIERS	ENVIRONMENTAL JUSTICE	LIKELIHOOD OF SUCCESS
A	Low	Medium	Low	Low	Medium	High
B	High	High	Medium	High	High	Medium
C	High	High	Medium	High	High	Medium
D	Medium	Medium	High	Medium	High	Low
E	High	High	Medium	High	High	Low

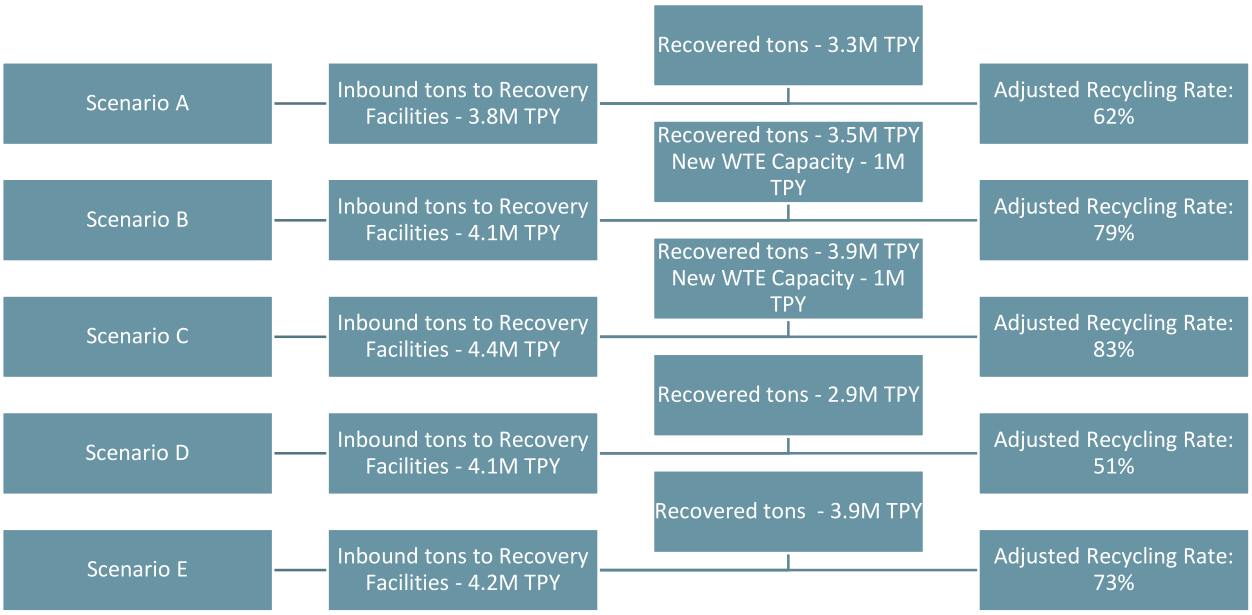
To inform the assessment of future solid waste system needs, an analysis was conducted of Broward County's projected population growth and associated waste generation rates. This analysis is based on population and solid waste material generation estimates, with **Table 4** presenting an overview of the next 20-year period.

Table 4. Broward County Population and Waste Generation Over 20 Years

Year	2025	2030	2035	2040	2045
Broward County Population Projection	2,020,000	2,090,000	2,140,000	2,190,000	2,230,000
Waste Tonnage Projection	5,320,000	5,690,000	6,000,000	6,260,000	6,500,000

For illustrative purposes, **Figure 1** provides a schematic of the best-case material flow in 2045 per scenario.

Figure 1. Estimated Material Flow Per Scenario



4.4.2.1 Scenario A – Maximizing Efficiency with Three Services/Week, Restoring Single-Stream Recycling and Adding Curbside Yard Waste Composting and Food Waste Drop-Off Centers

Scenario A is an option for the Authority to maximize efficiency of the current system and improve the overall diversion. In this scenario, residents will receive once a week curbside MSW pick-up and recycling collection, as well as once-a-week dedicated collection of yard waste.

Scenario A - Collections:

1. **MSW (1x/week):** Residential MSW collection would be reduced to once-a-week containerized collections to offset costs for the addition of a new yard waste collection service. Transitioning to once-a-week MSW collection can be phased in over time. As residents begin to become more familiar with waste reduction practices, local reuse opportunities, and increase their participation in recycling programs and proper disposal of HHW and electronic waste at drop-off centers, the volume of MSW placed in garbage carts will decrease over time.

2. **Recycling (1x/week):** Presently, 20% of residents do not have access to residential recycling, where five (5) municipalities (Coconut Creek, Deerfield Beach, Margate, Davie, and Pembroke Pines) have suspended or terminated their recycling programs, and recyclables are currently collected with their MSW and sent to the WTE (Coconut Creek Florida - Public Works, n.d.; Deerfield Beach Florida, n.d.; Margate Florida, n.d.; Pembroke Pines Florida, n.d.; Town of Davie, Florida, n.d.). In this first scenario, curbside residential recycling is restored for the 20% of the community that currently do not have service (representing approximately 70,000 single-family households). Some ILA member communities are recycling their SS recyclable materials and hauling directly to WM's

Reuter Recycling of Florida Facility (Reuter Facility) or long hauled from transfer stations before heading to this RMPF. Collection costs for the scenarios are detailed in Section 5 of this White Paper, however prices will vary between Automated-Side-Loader (ASL) collections and Rear End Loader (REL) collections.

3. **Yard Waste (1x/week):** Currently, Broward County does not directly or conventionally recycle residential yard or food waste within its jurisdiction. However, some yard waste delivered to transfer stations is diverted for use at third-party landfills as daily cover. According to the 2023 FDEP report, approximately 33% of the ~500,000 TPY of yard waste generated in the County is utilized as landfill cover (Florida DEP, 2024a). Broward County receives a 1:1 state recycling credit for the use of Alternative Daily Cover (ADC) under State Administrative Code 62-716.480 (Florida Department of State, 2012).

   Under **Scenario A**, the Authority introduces curbside yard waste collection services, with materials directed to two dedicated Organics Processing Facilities for mulch, biochar, and colorized product processing. These facilities are envisioned as scalable operations that can later incorporate food waste processing capabilities.

   To maximize the value of recovered organics in the form of compost, a comprehensive plan for marketing these materials as soil amendments is essential. As a next step, the Authority should engage qualified experts to conduct a market study and options analysis, focusing on the marketing and sale of compost-derived soil products. This strategic approach will ensure that recovered organics are effectively utilized, contributing to both economic and environmental sustainability.

4. **Food Waste (opt-in):** In the first scenario option, the Authority may add a cost-effective option for introducing food waste composting more widely to the community.

Scenario A - Option A: Establish Food Waste Drop-Off Special Events

To enhance food waste diversion, some communities across the country are establishing food waste drop-off events or centers where residents bring food waste on a weekly basis. In the case of the City of Alexandria, VA, the locality contracts with a third party to operate food waste collection at each of the farmers markets in the City (City of Alexandria Virginia, 2024). The contractor is responsible for the setup and breakdown of events each weekend and is staffed with up to two (2) attendants per site based on market size and traffic to educate residents about composting. Acceptable food waste is deposited weekly at no cost and compost caddies are given away to boost participation at program launch events or Earth Month events. **Figure 2** presents an image of a food waste drop-off center in Alexandria, VA.

Figure 2. City of Alexandria, VA Food Waste Drop-Off Centers

(Photo Courtesy: City of Alexandria)

In a similar manner, the Authority may partner with existing farmers markets, recreation centers, libraries, or other areas of high traffic to establish food waste drop-off sites for composting. The small amount of food waste collected can be processed in community composting programs or can be co-composted at the mulch/biochar/colorization facilities.

Scenario A - Option B: Permanent Food Waste Drop-Off Sites

Establishing 24/7 permanent food waste drop-off sites is another potential option. However, since these sites are typically unstaffed, they offer limited opportunities for engagement and quality control, potentially resulting in higher contamination rates within the waste stream.

Falls Church, VA, provides a useful case study, having implemented both food waste drop-off events and permanent sites. Their findings indicate that the convenience of permanent drop-off locations increased participation by up to 40% compared to weekly drop-offs at farmers' markets (Johnston, 2017). This demonstrates the potential for permanent sites to significantly enhance community engagement and food waste diversion efforts. **Figure 3** presents an informational resource for the food scraps collection program in Arlington County, VA.

Figure 3. Arlington County, VA "Food Scraps Collection"

Scenario A - Option C: On-Street Food Scraps Collection

A more contemporary approach involves local governments implementing on-street food scrap collection bins. For example, Arlington County, VA, launched a pilot program to collect food scraps and food-soiled paper using bins located outside multi-family properties. Participants are required to download an app that provides information on bin locations, availability, and accepted items. When the user's smartphone is within range of an available bin, the app unlocks the container, allowing for the disposal of food scraps.

Detailed program information, including an instructional video, is available on the County's website (Arlington County Virginia, n.d.).

For a summary of the collection cost analysis associated with each scenario, refer to **Appendix B**.

Scenario A - Processing:

1. **Municipal Solid Waste**

   Currently, MSW is hauled either directly to the only WTE facility currently operated in Broward County, the South Broward Resource Recovery Facility (RRF) or to transfer stations throughout the County, including Waste Management (WM) Davie, WM Deerfield and Waste Connections Pembroke Park. MSW is then sent to landfills including Broward County Landfill, J.E.D Landfill, Medley Landfill, Okeechobee Landfill, Desoto Recycling & Disposal, and the Monarch Hill Landfill. It should be noted that the South Broward RRF is owned and operated by WIN Waste, a private entity. Ash from the South Broward RRF is then disposed at the South Broward Ash Monofill.

   Scenario A recommends the construction of three transfer stations, to supplement the existing private transfer stations in the market, in order to support the efficient flow of material to disposal facilities. Scenario A assumes that the existing permitted disposal capacity at the South Broward RRF will continue to be used. It should be noted that WIN Waste Solutions, Inc. (WIN Waste) is currently contemplating the sale of the South

Broward RRF, and as such, future contract terms and conditions with a new owner/operator may be required for continued use of this disposal capacity. In addition, Scenario A contemplates the development of a new landfill while recognizing that existing landfill capacity may continue to be utilized in the future. However, consistent with the Authority's direction to "control their solid waste management destiny", the SCS Team has assumed that a new landfill, controlled by the Authority will be required.

2. Single-Stream Recycling

Currently, the Authority processes its SSR at WM's Reuter Facility, with processing fees ranging from $90 to $200 per ton depending on community contracts. WM is constructing a new, state-of-the-art 127,000-square-foot RMPF adjacent to the Reuter Facility. This $80+ million RMPF will have a processing capacity of 66 Tons Per Hour (TPH), equivalent to 260,000 TPY, and is referred to as the WM Recycling South Florida (WM South Florida Facility). While the region's current SS processing capacity is theoretically sufficient for 2023 tons, Scenario A recommends the development of two additional SS RMPF's for managing additional inbound tons in 2045. This recommendation is based on the assumption that the Authority implements policies, educational programs, enforcement, and new technologies that are discussed in Section 7 of this White Paper in order to maximize the capture of recyclables for recovery. Please see 6.1.1 for a greater discussion on the SS RMPF, options, costs, and timeline.

3. Organics Processing

Scenario A includes two Organics Processing Facilities with the ability to scale operations to meet additional processing capacity needs. Under this scenario, the facilities will process yard waste via two Mulch/Colorization operations and one Biochar Pyrolysis operation.

The mulching process will involve grinding yard waste, removing contaminants, and stockpiling materials in windrows for further decomposition and processing. To address challenges in the regional market for mulch and soil amendments, incorporating a colorization process is recommended to enhance product marketability and increase revenue potential.

Additionally, the pyrolysis of yard waste—particularly fibrous materials such as palm fronds and trimmings, which are slower to decompose—can provide operational flexibility for organics processing. This approach also creates market opportunities for biochar, a valuable end product with various applications in agriculture, landscaping, and environmental remediation.

4. Construction & Demolition RMPF

Current C&D processing facilities appear to have sufficient capacity to handle the existing tonnage under existing market conditions. However, it should be noted that the WM Monarch Hill landfill is used to dispose of C&D components that are not segregated for recycling and sale to the secondary market. Further, as tonnage increases and new policies or market developments enhance materials recovery and marketability, additional facilities will be required to meet the growing demand.

To address these future needs, assuming that adequate secondary markets exist, it is recommended to establish up to two strategically located C&D RMPF facilities to expand the region's C&D processing capacity. Each facility should be designed to process up to 450,000 TPY (equivalent to 100 TPH) to accommodate the estimated 850,000 TPY of C&D materials requiring processing. These facilities may be publicly or privately owned and operated, depending on regional needs and stakeholder preferences.

5. **Drop-Off Center for Hard-to-Recycle Materials**

– **Permanent Drop-Off Centers.** To strengthen recovery efforts, all five scenarios include the development of eight recycling drop-off centers. These permanent facilities will consist of two distinct areas:

1. One gated and staffed area, operating up to two days per week, dedicated to the collection of HHW and electronics.
2. A second, publicly accessible area, open 24/7, for the drop-off of SS recyclables and textiles.

Further details on the design and operation of the drop-off centers can be found in Section 6.1.5, Drop-Off Centers.

6. **Waste -to Energy**

Scenario A assumes that the existing permitted disposal capacity at the South Broward RRF will continue to be used. Note that WIN Waste is currently contemplating the sale of the South Broward RRF, and as such, future contract terms and conditions with a new owner/operator may be required for continued use of this disposal capacity.

Scenario A - Outcomes

Scenario A aims to strengthen the Authority's status quo by updating the recycling and organics recovery program through establishing additional infrastructure (organics) and negotiating access to existing capacity at the SSR Reuter Facility. **Table 4** summarizes expected recovery rates and **Table 5** presents the diversion facilities and capacity required, capital cost, operating cost, and summary of processing fees under Scenario A.

Table 4. Scenario A Recovery Tonnages Summary – Estimated Outcome in 2045

Scenario A	Estimated Outcome in 2045
Incoming Tons to New Recovery Facilities	3,800,000
Recovered Tons	3,300,000
Residue Tons	500,000
Traditional Recycling %	54%
Adjusted Recycling % with WTE and Landfill Credits	62%
GHG Benefit (MTCO2e)	1,500,000

Table 5. Scenario A New Diversion Facilities and Capacity Required, Capital Cost, Operating Cost, and Summary of Processing Fees (est. 2025 dollars)

Description	Qty	Capacity (TPY/Facility)	CapEx[8]/ Facility	Annual OpEx[9]/ Facility	Processing Fee ($/Ton)	Aggregated ($/Ton /Facility)
SS RMPF	2	250,000	$72M	$14M	$89	$35
Yard Waste Mulch Facility	2	175,000	$5M	$1.8M	$14	($32)
Pyrolysis	1	30,000	$10M	$700k	$57	$13
C&D RMPFs	2	450,000	$41M	$19M	$50	$60
Public Drop-Off Centers	8	12,000	$140k	$1M	$86	$86
Transfer Stations	3	890,000	$47M	$31M	$87	$27
Landfill	1	3M	$880M	$229M	$91	$41

4.4.2.2 Scenario B – Adding Curbside Food Waste Composting Collections and a New Waste-to-Energy Facility

Scenario B expands upon the food waste collection options presented in Scenario A. To enhance convenience and accessibility, curbside food waste collection services will be implemented weekly.

Given that 12% of Broward County's MSW stream is composed of food waste, a strategic adjustment to waste collection schedules is necessary. To optimize costs associated with adding a fourth collection stream, MSW collection frequency for all Authority residents will be reduced to once-a-week curbside pickup. Additionally, recycling services will be restored to the 20% of residents who currently lack access and separate once-a-week curbside collections will be established for food waste and yard waste.

Scenario B also includes the development of a new 1,000,000 TPY WTE facility. Assuming the new WTE facility will be equipped with AMR, approximately 46,200 TPY of metals will be recovered and it will produce approximately 675,000 megawatt hours (MWh) of energy annually. Note that the new WTE facility will supplement the existing 750,000 TPY South Broward RRF. In addition, Scenario B contemplates the development of a new landfill recognizing that existing landfill capacity may continue to be utilized in the future. However, consistent with the Authority's direction to "control their solid waste management destiny," the SCS Team has assumed that a new landfill, controlled by the Authority, will be required.

[8] Capital Expenditures (Cap/Ex)
[9] Operational Expenditures (Op/Ex)

Scenario B - Collections:

1. **MSW (1x/week):** As discussed in Scenario A, Scenario B also includes reduction of residential MSW collection to once-a-week containerized collections to offset costs.

2. **Recycling (1x/week):** As discussed in Scenario A, Scenario B also includes restoring curbside recycling access once a week to the 20% of residents currently lacking access.

3. **Yard Waste (1x/week):** Similar to Scenario A, Scenario B also adds yard waste curbside collection once-a-week to all residents. It is estimated that while the program is currently accessible to all residents, approximately 80% are anticipated to participate in the program.

4. **Food Waste Only (1x/week):** Scenario B adds a once-a-week dedicated curbside food waste collection. Diverting food waste from landfill to composting provides significant GHG emissions reductions and converts a waste product into a beneficial soil product.

    a. **Curbside Composting Implementation Paths -** Municipalities have several options for initiating curbside food waste collection programs, depending on their budget, population size, and local regulations. Three common implementation paths include:

        i. **Pilot Programs:** Many municipalities start with small-scale pilot programs in selected neighborhoods to test the effectiveness of food waste collection and public messaging designed to encourage participation. This phased approach helps identify potential challenges, including public participation, contamination levels, and collection logistics. Insights gained from pilot projects can inform larger-scale rollouts.

        ii. **Full-Scale Rollouts:** Some programs opt for immediate systemwide implementation. While this can provide faster results, it requires significant upfront investment in infrastructure, public education, and operational adjustments.

        iii. **Optional vs. Mandatory Participation:** In some cases, food waste collection is an optional service, while in others, participation is mandated. Optional programs allow residents to opt-in, while mandatory programs require all households to participate, which can lead to higher diversion rates but may require more aggressive marketing, education, and enforcement.

    b. **Collection Container Variety -** The choice of collection containers is crucial in curbside composting, as it affects both the efficiency of the program and public participation.

        i. **Kitchen Caddies:** In numerous municipalities, small countertop containers are distributed to residents ahead of the rollout of curbside food scrap collection programs. These containers help residents conveniently collect food scraps indoors before transferring them to larger outdoor bins. Typically, these caddies are equipped with biodegradable liners to minimize odors and prevent spillage, enhancing ease of use and encouraging greater participation in the program.

ii. **Curbside Bins:** Outdoor collection containers are available in different sizes, from 5-gallon buckets to 65-gallon bins, depending on pickup frequency and household size. Some municipalities use containers like those used for recycling or garbage, while larger municipalities may implement specialized, sealed bins to reduce odors and deter pests. Alexandria, Virginia's curbside food waste composting program uses green, 7-gallon containers with snap-on lids, along with compostable bags. These containers are manually collected at the curb. Some localities that have adopted smaller container programs, such as the 7-gallon bins in Alexandria, as opposed to standardized larger containers (35 or 65-gallon), have observed reduced contamination and improved quality of the organics stream.

iii. **Compostable Bags:** In some municipal curbside composting programs, residents are encouraged or required to use compostable bags inside their curbside bins. These bags make it easier for collectors to transfer waste and reduce the chances of spillage and contamination of non-compostable materials. This may be a suitable option for the Authority, particularly to manage odors, pests, and spillage.

c. **Vehicle Differences -** The choice of collection vehicles impacts the efficiency and cost-effectiveness of food waste collection. The following vehicle types are commonly used:

i. **Dedicated Organic Waste Trucks:** These trucks are specifically designed for organic waste collection and often include features like airtight compartments to prevent leaks and odors. Some options include a stainless-steel hopper due to the corrosive nature of food waste and its associated liquids. These trucks are ideal for municipalities with large-scale composting programs but represent a higher initial investment.

ii. **Retrofitted Garbage Trucks:** Retrofitting existing garbage trucks to accommodate food waste can be a cost-effective solution. These trucks may not have specialized features like dedicated organic collection vehicles, but they can serve as a temporary or permanent solution for smaller programs.

iii. **Vehicle types:** There are three primary options for collecting food waste at the curb: standard pickup trucks with a hopper, Rear-End Loader (REL) trucks, and Automated Side Loader (ASL) trucks. The first two options require manual collection of bags or carts, which are then loaded into the truck's hopper. In contrast, the ASL option uses a mechanical arm to collect the material and deposit it into the hopper, though it also necessitates the use of roll carts as the collection container.

iv. One advantage of using a standard pickup truck is that the driver is not required to hold a Commercial Driver's License (CDL), whereas both REL and ASL trucks do have this requirement. REL trucks typically require one CDL-certified driver and up to two helpers to manually collect carts and/or operate cart lifters to load materials into the truck. The selection of collection vehicles will depend on factors such as program participation levels and the frequency of collection.

d. **Financing and Payment Structures** - Curbside food waste collection programs present distinct operational challenges compared to traditional garbage or recycling programs. The design of a food waste collection system, including encompassing cart size, vehicle type, and processing capacity, will be influenced by numerous factors, including policy, budget, and community interest.

Participation rates can vary based on factors such as residential engagement, community awareness, community-based social marketing efforts, program costs, and convenience. Voluntary, opt-in, and partially subsidized programs see participation rates of up to 20%. In contrast, mandatory programs, incorporated into overall service fees, have achieved participation rates of 85-90% or higher on the West Coast, following years of education and strict enforcement efforts.

i. **Fully Subsidized Service Model:** In this model, the municipality fully funds the food waste composting service through its General Fund, Special Purpose/Enterprise funds, or residential refuse fees. All eligible residents are automatically enrolled in the program, receiving containers and weekly collection services.

ii. **Pay-As-You-Throw (PAYT) Model:** The PAYT model incentivizes waste reduction by charging residents based on the amount of material generated. This approach can effectively divert organics and reduce overall waste volumes.

iii. **Partially Subsidized Model:** This model shares the cost of the service between the municipality and residents. The municipality may cover initial setup costs (e.g., containers, delivery, educational materials, and compostable bags) and/or a portion of the weekly collection fees. In some cases, a trial period (e.g., six (6) months) is offered, after which residents can choose to continue the service at their own expense.

iv. **Open Market Model:** In this model, residents are responsible for selecting and contracting with private composting haulers to provide weekly collection services. Municipalities may facilitate this process by issuing a solicitation to attract haulers and offer bulk pricing to residents, reducing barriers to entry for haulers and increasing service options for residents.

5. **Scenario B - Additional Processing:**

a. **Municipal Solid Waste.** Scenario B recommends the construction of three new transfer stations, supplementing the existing private transfer stations in the market, to enhance the efficiency of material flow to disposal facilities. Additionally, Scenario B assumes the development of a new 1,000,000 TPY WTE facility, while continuing to utilize capacity at South Broward RRF. Development of a new landfill is required, recognizing that existing landfill capacity may continue to be utilized in the future.

b. **Single Stream Recycling.** Scenario B also recommends the addition of two SSR processing facilities to manage the increased volume of inbound material by 2045. This recommendation assumes the adoption of policies, educational programs, enforcement strategies, and new technologies, as discussed in Section 7 of this White Paper, to maximize the recovery of recyclables. For a more detailed

discussion on the SS RMPF facility, including options, costs, and timeline, please refer to Section 6.1.1.

c. **Organics Processing Facilities.** Two new facilities with the ability to scale operations to increase processing capacity and meet the Authority's future capacity needs are recommended. As the mass of food waste increases (exceeding 15% by volume), one CASP composting operation will be added to provide efficient composting of the food waste along with a portion of the yard waste. CASP reduces odors and enables better control over operating parameters, making it an efficient composting technique. The remaining yard waste will be processed at the two Mulch/Colorization operations, One Biochar Pyrolysis operation will provide operational flexibility for yard waste processing. In addition, under this scenario, biochar can be used as an amendment to accelerate the composting process and/or added to the compost end-product to increase market value and thus revenue.

6. **Construction & Demolition Recycling RMPF**

   Up to two strategically located facilities are recommended to add processing capacity to the region. The facilities should each have a throughput capacity of 450,000 TPY or 100 TPH to manage the 850,000 TPY needing processing. Facilities may be either publicly- or privately- owned and operated, dependent on the Authority's goals and objectives.

7. **Drop-Off Centers for Hard-to-Recycle Materials**

   – **Permanent Drop-Off Centers:** To strengthen recovery efforts, all five scenarios include the development of eight recycling drop-off centers. These permanent facilities will consist of two distinct areas:

      i. One gated and staffed area, operating up to two days per week, dedicated to the collection of HHW and electronics.

      ii. A second, publicly accessible area open 24/7 for SS recyclables and textiles drop-off.

      Further details on the design and operation of the drop-off centers can be found in Section 6.1.11, Drop-Off Centers.

8. **Outcomes**

   Scenario B strengthens the Authority's status quo by conducting the infrastructure improvement discussed in Scenario A as well as the implementation of special collections and the development of a new WTE facility. **Table 6** summarizes expected recovery rates and **Table 7** presents the diversion facilities and capacity required, capital cost, operating cost, and summary of processing fees under Scenario B.

For summary results of the collection cost analysis for each scenario, see **Appendix B**.

Table 6. Scenario B Recovery Tonnages Summary – Estimated Outcome in 2045

Scenario B	Estimated Outcome in 2045
Incoming Tons to New Recovery Facilities	3,800,000
Recovered Tons	3,300,000
Residue Tons	500,000
Traditional Recycling %	54%
Adjusted Recycling % with WTE and Landfill Credits	78%
GHG Benefit (MTCO2e)	1,600,000

Table 7. Scenario B New Diversion Facilities and Capacity Required, Capital Cost, Operating Cost, and Summary of Processing Fees (est. 2025 dollars)

Description	Qty	Capacity (Tons Per Year/Facility)	CapEx/ Facility	Annual OpEx/ Facility	Processing Fee ($/Ton)	Aggregated ($/Ton /Facility)
SS RMPF	2	250,000	$72M	$14M	$89	$35
Yard Waste Mulch Facility	2	175,000	$5M	$1.8M	$14	($32)
CASP Compost Zones Incorporated in Organics Facility	1	73,000	$12M	$1.7M	$35	($80)
Pyrolysis	1	30,000	$10M	$700k	$57	$13
C&D RMPFs	2	450,000	$41M	$19M	$50	$60
Public Drop Off Centers	8	12,000	$140k	$1M	$86	$86
Transfer Stations	3	546,000	$28M	$19M	$86	$26
WTE	1	1,000,000	$990M	$14M	$14	$147
Landfill	1	2.2M	$1,086M	$182M	$99	$41

4.4.2.3 Scenario C – Co-Collecting Food Waste and Yard Waste and a New Waste-to-Energy Facility

In Scenario C, food waste and yard waste are co-collected in a single container using the same collection vehicle on a weekly basis. This co-collection approach represents an efficient method for collecting organic materials, as both waste streams are consolidated within a single route. By streamlining the collection process, co-collection reduces GHG emissions, hauling costs, and road wear compared to the alternative of collecting food waste and yard waste on separate routes.

Transitioning to a once-a-week service is recommended and has been incorporated into the cost model for this option to help mitigate the expenses associated with implementing organics collection. Additionally, as outlined in Scenarios A and B, recycling services would be expanded to provide access to the 20% of residents who currently lack recycling collection.

Scenario C also includes the development of a new 1,000,000 TPY WTE facility. Assuming the new WTE facility will be equipped with AMR, approximately 46,200 TPY of metals will be recovered and it will produce approximately 675,000 MWh of energy annually. Note that the new WTE facility will supplement the 750,000 TPY South Broward RRF. In addition, Scenario C contemplates the development of a new landfill recognizing that existing landfill capacity may continue to be utilized in the future. However, consistent with the Authority's direction to "control their solid waste management destiny," the SCS Team has assumed that a new landfill, controlled by the Authority, will be required.

Scenario C - Collection Services:

1. **Municipal Solid Waste – (1x/week):** Similarly to Scenarios A and B, Scenario C also includes reduction of residential MSW collection to once-a-week containerized collections to offset costs.

2. **Recycling – (1x/week):** Scenario C ensures that weekly curbside recycling service is restored to the 20% of residents without current access.

3. **Co-Collection of Food and Yard Waste – (1x/week):** Scenario C assumes once-a-week containerized residential food and yard waste co-collection.

   Rationale for Co-Collection. Many municipalities with progressive waste diversion policies (e.g., zero-waste initiatives) require organics diversion to achieve high diversion goals. Co-collecting food and yard waste in the same cart, vehicle, and route is among the most efficient and cost-effective methods to integrate organics into waste diversion programs. It should be noted that when co-collecting food and yard waste together, the entire volume of the combined waste is defined as solid waste and must be treated as such, based on Florida Statutes.

   a. **Implementation Considerations:** The implementation pathways for composting, and financing structures outlined in Scenario B, are also applicable to Scenario C. Curbside collection would require the use of REL trucks and the use of roll cart containers to effectively manage yard waste volumes.

   b. **Processing Capacity and Methods:** Collected food and yard waste will be processed at an organics facility utilizing either windrow composting or CASP.

c. **Participation Rate Impact:** Collection volumes and cost-per-ton are influenced by the program's participation rate. Participation refers to the proportion of eligible households that choose to include food waste in their co-collection carts alongside yard waste. Participation rates are highly variable and depend on program design, promotional efforts, education, outreach, supporting policies that encourage organics diversion, as well as enforcement, as applicable.

Co-collecting food and yard waste provides a cost-effective, environmentally sustainable path to addressing the Authority's waste management needs and aligns with the Authority's goals for waste diversion and resource recovery.

For summary results of the collection cost analysis for each scenario, see **Appendix B**.

Scenario C - Additional Processing:

1. **Municipal Solid Waste.** Scenario C recommends the construction of three new transfer stations, supplementing the existing private transfer stations in the market, to enhance the efficiency of material flow to the disposal facilities. Additionally, Scenario B assumes the development of a new WTE facility with a capacity of 1,000,000 TPY, while continuing to utilize capacity at South Broward RRF. Development of a new landfill is required, recognizing that existing landfill capacity may continue to be utilized in the future.

2. **Single Stream Recycling.** Scenario C also recommends development of two additional SS RMPFs for managing additional inbound tons of SS recyclables in 2045. This assumes that policy, educational programs, enforcement, and new technologies discussed in Section 7 of this White Paper are adopted to maximize the capture of recyclables for recovery. Please see 6.1.1 for a greater discussion on the SS RMPF facility, options, costs, and timeline.

3. **Organics Facilities:** Two facilities are recommended with scalable operations to accommodate varying needs. Additional recovered food waste can be managed alongside yard waste and composted using CASP technology. In total, 10CASP composting operations will handle both food and yard waste. Any remaining yard waste will be converted into biochar through a single biochar pyrolysis operation. Consistent with the other scenarios, biochar can be utilized to process yard waste that is difficult to decompose. It may also be incorporated into the composting process to accelerate decomposition and/or added to the final compost product to enhance its value.

4. **C&D Recycling RMPF:** Up to two (2) strategically located facilities are recommended to add processing capacity to the region. The facilities should each have a throughput capacity of 450,000 TPY or 100 TPH to manage the 850,000 TYP processing needs. Facilities may be either publicly- or privately- owned and operated.

5. **Drop-Off Center for Hard-to-Recycle Materials**

   – **Permanent Drop-Off Centers:** To enhance recovery efforts, all five scenarios propose the development of eight permanent recycling drop-off centers. These facilities will feature two distinct areas:

      i. A gated, staffed section operating up to two days per week for the collection of HHW and electronics.

ii. A publicly accessible section, open 24/7, for SS recyclables and textiles drop-off.

Further details on the design and operation of the drop-off centers can be found in Section 6.1.11, Drop-Off Centers.

6. **Outcomes:** Scenario C enhances the Authority's existing waste management framework by implementing the infrastructure improvements outlined in Scenario A while also including a new WTE facility. Additionally, it introduces targeted special collections to achieve modest gains in material recovery. A cornerstone of Scenario C is the implementation of an ambitious residential food and yard waste co-collection program, which drives a substantial increase in organics recovery and aligns with the Authority's broader sustainability objectives. **Table 8** summarizes expected recovery rates and **Table 9** presents the diversion facilities and capacity required, capital cost, operating cost, and summary of processing fees under Scenario C.

Table 8. Scenario C Recovery Tonnages Summary – Estimated Outcome in 2045

Scenario C	Estimated Outcome in 2045
Incoming Tons to New Recovery Facilities	4,200,000
Recovered Tons	3,600,000
Residue Tons	500,000
Traditional Recycling %	59%
Adjusted Recycling % with WTE and Landfill Credits	83%
GHG Benefit (MTCO2e)	1,820,000

Table 9. Scenario C New Diversion Facilities and Capacity Required, Capital Cost, Operating Cost, and Summary of Processing Fees (est. 2025 dollars)

Description	Qty	Capacity (Tons Per Year/Facility)	CapEx/ Facility	Annual OpEx/ Facility	Processing Fee ($/Ton)	Aggregated ($/Ton /Facility)
Single Stream RMPF	2	250,000	$72M	$14M	$89	$35
Yard Waste Mulch Facility	2	175,000	$5M	$1.8M	$14	($32)
CASP Compost Zones Incorporated in 2 Organics Facilities	10	73,000	$12M	$1.7M	$35	($80)
Pyrolysis	1	30,000	$10M	$700k	$57	$13
C&D RMPFs	2	450,000	$41M	$19M	$50	$60

Description	Qty	Capacity (Tons Per Year/Facility)	CapEx/ Facility	Annual OpEx/ Facility	Processing Fee ($/Ton)	Aggregated ($/Ton /Facility)
Public Drop-Off Centers	8	12,000	$140k	$1M	$86	$86
Transfer Stations	3	443,000	$24.5M	$17M	$94	$34
WTE	1	1,000,000	$990M	$14.4M	$14	$147
Landfill	1	2.1M	$1,131M	$177M	$100	$42

4.4.2.4 Scenario D – Wet/Dry MSW Collection and Yard Waste

Scenario D introduces a new approach to waste collection for the Authority by dividing MSW into two distinct streams: wet and dry waste.

This system aims to address gaps in recycling participation by capturing recyclable materials in the "dry waste" stream from the following sources:

- Multi-family units lacking access to recycling programs.
- Single-family households that do not actively participate in recycling programs.
- Public and commercial recycling access points where traditional recyclables are collected but may be of lower quality.

Scenario D - System Design

- Wet MSW Containers: Designed to collect organics, disposable hygienic paper, and other moisture-laden materials.
- Dry MSW Containers: Used for recyclables, separated packaging, household containers (e.g., films, storage containers, pottery), consumed or worn-out products, and other dry, non-hazardous waste materials.

Scenario D - Discussion

Wet-Dry solid waste systems first gained traction during the perceived landfill crisis of the late 20th century. At that time, dry waste was processed using screening technology to recover paper and metals, although plastics were excluded due to low market demand. While high paper prices between 1995 and 1997 initially supported the viability of these systems, subsequent declines in paper and cardboard prices, along with low landfill tipping fees (averaging $30 per ton nationally), made the facilities economically unsustainable. Most systems were closed or repurposed by the early 2000s.

Today, advancements in automated waste processing technology and the incorporation of organics processing, which were absent in earlier implementations, have revitalized Wet-Dry systems as a viable solution for achieving high-diversion goals. With current national landfill tipping fees averaging $58 per ton and Class I landfill (landfill that is permitted to receive MSW) fees in Broward County reaching $110 per ton, the economic rationale for these systems has strengthened.

Compared to MWP facilities (see Scenario E), modern Wet-Dry systems can achieve comparable diversion rates at potentially lower costs but require proper wet/dry waste sorting by solid waste customers. By leveraging advanced sorting technologies and robust organics processing, these systems maximize recovery across the waste supply chain, aligning with contemporary solid waste management goals.

Scenario D - Key Features of the Modern Wet-Dry System:

- Separation of Waste Streams: Distinct wet and dry collection for improved sorting efficiency and reduced costs.
- Advanced Automation: Utilization of modern technology to recover materials like plastics, metals, and high-quality fibers.
- Organics Processing: Inclusion of AD for wet MSW materials.
- Scalable Infrastructure: Designed to accommodate varying household types and participation levels.

This approach aligns with the Authority's goal of offering a flexible, efficient solution for managing solid waste.

Scenario D - Collection:

1. **Wet and Dry MSW Collection**

    a. **Wet MSW (2x/week) and Dry MSW (1x/week):**

    - **Residential Collection for Wet and Dry MSW.** Under this scenario, all residential units, including multi-family dwellings, would participate in Wet and Dry MSW collection. There would be no exclusions based on the number of units per complex. Multi-family properties exceeding a designated threshold would continue to be served by the open commercial market, which would also adopt wet-dry waste separation.
    - **Residential Requirements.** Residents would separate their waste into two distinct containers, each color-coded to differentiate wet waste from dry waste. This change would necessitate CapEx to provide new containers for all residential participants.
    - **Multi-Family Requirements.** Multi-family properties would require additional infrastructure to facilitate wet-dry waste separation. This could include separate containers, compactors, or split-body compactors. Properties served under municipal collection programs would remain under municipal contracts, while those outside this scope would be serviced by the open commercial market. Like single-family homes, these properties would also incur CapEx for new containers.
    - **Recyclables Recovery for Multi-Family Units.** Scenario D would enable high-density multi-family residences that currently lack recycling programs to recover

packaging materials, such as bottles, containers, paper, and cardboard, through processing at a proposed Commercial Dry MSW Recycling and a RMPF.

- **Infrastructure Investments.** Infrastructure investments would include CapEx for new waste containers across all residential units, ensuring the successful implementation of the Wet-Dry MSW system.

- **Mandatory Wet-Dry Separation for All Multi-Family Units:** This system ensures comprehensive coverage for multi-family dwellings, eliminating current restrictions based on unit thresholds. As part of the Authority's long-term zero-waste objectives mandatory commercial recycling collection for non-exclusive, open-market solid waste collectors may need to be introduced. Such regulatory changes could include targeted waste requirements based on industry-specific waste characteristics or minimum collection volumes per service interval.

2. **Single-Stream Recycling (Integrated with Dry MSW, 1x/week):** SSR would be integrated into the weekly Dry MSW collection to optimize the number of hauling streams required under this scenario. In addition to the recyclables currently collected curbside, rigid containers previously missing in the MSW stream would also be captured for processing.

3. **Yard Waste Collection (1x/week):** As with all scenarios, weekly yard waste collection remains a critical component of the Authority's strategy to achieve high diversion rates and align with sustainability goals.

This integrated approach supports efficient resource recovery, optimizes collection logistics, and advances the Authority's zero-waste objectives over the planning horizon.

For summary results of the collection cost analysis for each scenario, see **Appendix B**.

Scenario D - Additional Processing:

- **Municipal Solid Waste.** Scenario D recommends the building of three transfer stations, in addition to the existing private transfer stations in the market, to support the efficiency of material flow to disposal facilities. Scenario D assumes that the existing permitted disposal capacity for the WTE facility at South Broward RRF will continue to be used. It should be noted that WIN Waste is currently contemplating the sale of the South Broward RRF, and as such, future contract terms and conditions with a new owner/operator may be required for continued use of this disposal capacity. In addition, Scenario D contemplates the development of a new landfill recognizing that existing landfill capacity may continue to be utilized in the future. However, consistent with the Authority's direction to "control their solid waste management destiny," the SCS Team has assumed that a new landfill, controlled by the Authority, will be required.

- **Six Dry MRF (Recycling and Materials Processing Facilities)**

  – **Facility Overviews.** Each 160,000 TPY Dry MRF would target a diversion rate of 25%, leveraging advanced processing technologies to recover high-quality materials from the dry waste stream.

- **Dry MRF Diversion Benefits:**

  1. The absence of organics contamination ensures higher-quality recovered materials.

  2. Processing of dry residential materials would prioritize metals and plastics, with the potential to include paper containers (OCC) and other clean paper products.

  3. Expanded diversion efforts would include wood, clean film, bulky plastics, inert materials (e.g., brick and rock), and other recoverable items.

- **Key Dry MRF Recovery Targets:**

  1. 90% recovery of rigid containers not captured through existing recycling programs would be captured in this scenario.

  2. 25% recovery of clean film would be captured in this scenario.

  3. This scenario is projecting a minimum total dry waste diversion of 20–25%.

- **MRF Material Streams Processed:** The facilities would accept and process the following material streams currently underserved:

  1. Residential Dry Waste: The inclusion of these facilities would allow for increased material recovery from multifamily dwellings.

  2. Commercial SS Waste: The inclusion of these facilities would allow for increased recovery of non-organic, non-hazardous commercial waste streams.

  3. Processing Capacity: Two processing lines for Dry MSW, each handling 75–125 TPH.

- **Key Components Needed in MRFs:**

  1. A Pre-shred bag opener should be included to optimize material preparation.

  2. A Pre-sorting station should be included to remove bulky items, incompatible materials, large film pieces, and bag-in-bag waste.

  3. A Trommel screen, a machine that separates materials by size using a rotating drum with holes or mesh, should be included to segment materials into three size fractions for targeted separation.

- **Automated Sorting Technologies:**

  1. Optical and ballistic separators should be included to recover paper, rigid containers, films, and other recyclable materials.

  2. Magnets and eddy current separators should be included for recovering ferrous and non-ferrous metals, including aluminum.

- **Advanced Sorting Assistance:**

    1. Systems such as air density separation, paper drum magnets, optical identification (AI + NIR), air jets, or robotic sortation for precise material recovery should be included.

- **Residual Management:**

    1. The inclusion of a final optical sorter to capture remaining rigid containers and other targeted 3D materials, which are then recirculated through the system, should be included.

    2. Any remaining undersized materials in the residual are then directed to disposal.

- **AD Facilities.** Three AD facilities (160,000 TPY each) are recommended to capture wet waste for digestion and recovery of Renewable Natural Gas (RNG). In addition, dewatering to recover solid digestate and direct waste liquid to local wastewater treatment facilities is recommended. These recommendations result in a minimum total wet waste diversion of between 20-25%.

- **Organics Processing Facilities.** Two Mulch/Colorization operations and one Biochar Pyrolysis operation will process collected yard waste. The pyrolysis unit is capable of converting hard-to-decompose materials into biochar, which can generate revenue. Alternatively, biochar may be utilized in the AD process to enhance methane yield or potentially mitigate Per- and Polyfluoroalkyl Substances (PFAS), also known as forever chemicals that have been identified as a growing environmental threat, in the digester effluent. For additional details, refer to the Task 9: Innovative and Future Technologies White Paper.

- **C&D Recycling RMPF.** Up to two strategically located facilities are recommended to add processing capacity to the region. The facilities should each have a throughput capacity of 450,000 TPY or 100 TPH to manage the 850,000 TPY processing needs. Facilities may be either publicly or privately owned and operated.

- **Drop-Off Centers for Hard-to-Recycle Materials:**

    - **Permanent Drop-Off Centers** - To enhance recovery efforts, all five scenarios propose the development of eight permanent recycling drop-off centers. These facilities will feature two distinct areas:

        1. A gated, staffed section operating up to two days per week for the collection of HHW and electronics.

        2. A publicly accessible section, open 24/7, for SS recyclables and textiles drop-off.

        Further details on the design and operation of the drop-off centers can be found in Section 6.1.11, Drop-Off Centers.

Scenario D - Outcomes

Scenario D employs a distinct approach compared to the other Scenarios by splitting collections into two waste streams: Dry Waste (recyclables and non-organic materials) and Wet Waste (organics). Key outcomes include:

- Enhanced Material Recovery: Dedicated Dry MRFs enable the recovery of a broader range of recyclables and materials currently lost in traditional systems.
- Increased Organics Diversion: The Wet Waste stream incorporates a robust residential food waste collection program, significantly improving organics recovery rates.
- Integrated Waste Management: The program complements existing mulch initiatives, creating a comprehensive solution for achieving the Authority's diversion and sustainability goals.

This strategy leverages advanced infrastructure and technology to deliver high recovery rates, reduce contamination, and optimize waste stream management. **Table 10** summarizes expected recovery rates and **Table 11** presents the diversion facilities and capacity required, capital cost, operating cost, and summary of processing fees under Scenario D.

Table 10. Scenario D Recovery Tonnages Summary – Estimated Outcome in 2045

Scenario D	Estimated Outcome in 2045
Incoming Tons to New Recovery Facilities	4,000,000
Recovered Tons	2,700,000
Residue Tons	1,400,000
Traditional Recycling %	45%
Adjusted Recycling % with WTE and Landfill Credits	51%
GHG Benefit/(Increase) (MTCO2e)	(260,000)

Table 11. Scenario D New Diversion Facilities and Capacity Required, Capital Cost, Operating Cost, and Summary of Processing Fees (est. 2025 Dollars)

Description	Qty	Capacity (Tons Per Year/Facility)	CapEx/ Facility	Annual OpEx/ Facility	Processing Fee ($/ton)	Aggregated ($/ton /facility)
Dry MRF	6	160,000	$49M	$18M	$108	$61
AD (Wet Waste)	3	160,000	$64M	$10M	$100	$48
Yard Waste Mulch Facility	2	175,000	$5M	$1.8M	$14	($32)

Description	Qty	Capacity (Tons Per Year/Facility)	CapEx/ Facility	Annual OpEx/ Facility	Processing Fee ($/ton)	Aggregated ($/ton /facility)
Pyrolysis	1	30,000	$10M	$700k	$57	$13
C&D RMPFs	2	450,000	$41M	$19M	$50	$60
Public Drop Off Centers	8	12,000	$140k	$1M	$86	$86
Transfer Stations	3	1.0M	$52M	$35M	$84	$24
Landfill	1	3.4M	$814M	$261M	$89	$41

4.4.2.5 Scenario E – Mixed Waste Technologies, Fiber Capture, and Anaerobic Digestion

Scenario E is unique in that it diverts MSW to a MWP Facility for advanced processing. SSR is reintroduced for residents currently without service. Food and yard waste are co-collected and transported to an organics processing campus for composting, while the remaining MSW is directed to a MWP Facility equipped with fiber extraction technology to recover pulp, and an AD to process extracted wet waste. Additionally, SS recyclables are further recovered at the SSR Facilities.

Scenario E – Collections.

1. **MSW (1x/week):** Similarly to the other scenarios, Scenario E includes a reduction of residential MSW collection to once-a-week containerized collections to offset costs.

2. **Recycling (1x/week):** As discussed in the previous scenarios, Scenario E also includes restoring curbside recycling access once a week to the 20% of residents currently lacking access.

3. **Yard Waste (1x/week):** Scenario E adds once-a-week yard waste curbside collection to all Authority residents. It is estimated that while the program would be accessible to all residents, approximately 80% of Authority residents will participate in the program.

4. **Food Waste Co-Collected with Yard Waste (1x/week):** Scenario E assumes once-a-week containerized residential food and yard waste co-collection.

For summary results of the collection cost analysis for each scenario, see **Appendix B**.

5. **Additional Processing**

   – **Municipal Solid Waste.** Scenario E recommends the building of three transfer stations, in addition to the existing private transfer stations in the market. These additions would support the efficiency of material flow to disposal facilities. Scenario E assumes that the existing permitted disposal capacity at the South Broward RRF will continue to be used. Note that WIN Waste is currently contemplating the sale of the South Broward RRF, and as such, future contract terms and conditions with a new owner/operator may be required for continued use of this disposal capacity. In addition, Scenario E contemplates the development of a new landfill recognizing that

existing landfill capacity may continue to be utilized in the future. However, consistent with the Authority's direction to "control their solid waste management destiny," the SCS Team has assumed that a new landfill, controlled by the Authority, will be required.

  - **Single Stream Recycling.** Scenario E also recommends two additional SS RMPF's for managing additional inbound tons of SSR in 2045. This assumes that policy, educational programs, enforcement, and new technologies discussed in Section 7 of this White Paper are adopted to maximize the capture of recyclables for recovery. Please see 6.1.1 for a greater discussion on the SS RMPF facility, options, costs, and timeline.

Organics Processing Facilities. Two facilities are recommended with scalable operations to accommodate varying needs. Additional recovered food waste can be managed alongside yard waste and composted using CASP technology. In total, ten CASP composting operations will handle both food and yard waste. Any remaining yard waste will be converted into biochar through a single biochar pyrolysis operation. Biochar can be utilized to process yard waste that is difficult to decompose. It may also be incorporated into the composting process to accelerate decomposition and/or added to the final compost product to enhance its value. Alternatively, biochar may be utilized in the AD process to enhance methane yield or potentially mitigate PFAS in the digester effluent. For additional details, refer to Task 9: Innovative and Future Technologies White Paper.

- **Mixed Waste Processing Facility.** Scenario E enhances the Authority's waste management infrastructure by implementing the improvements outlined in Scenario A and introducing a robust residential food waste collection program. This initiative significantly boosts organics recovery rates. The remaining MSW of approximately 1,000,000 TPY is directed to a MWP Facility for advanced processing. Recyclables are sorted, and cellulose fiber is extracted for use in papermaking. A total of three MWP Facilities (330,000 TPY each) with single stream extraction, fiber extraction, and high solids AD. This facility is further described in Section 6.1.9.

- **Construction & Demolition Recycling RMPF.** Up to two strategically located facilities are recommended to add processing capacity to the region. The facilities should each have a throughput capacity of 450,000 TPY or 100 TPH to manage the 850,000 tons needing processing. Facilities may be either publicly- or privately- owned and operated.

- **Drop-Off Center for Hard-to-Recycle Materials:**

  - **Permanent Drop-Off Centers.** To strengthen recovery efforts, all five scenarios include the development of eight recycling drop-off centers. These permanent facilities will consist of two distinct areas:

    1. One gated and staffed area, operating up to two days per week, dedicated to the collection of HHW and electronics.

    2. A second, publicly accessible area open 24/7 for the drop-off of SS recyclables and textiles.

Further details on the design and operation of the drop-off centers can be found in Section 6.1.11, Drop-Off Centers.

Outcomes

Scenario E enhances the Authority's waste management system by implementing advanced MWP, introducing specialized collection programs to optimize recovery rates and enhance customer service, and launching an aggressive residential food waste collection program to significantly boost organics recovery. **Table 12** summarizes expected recovery rates and **Table 13** presents the diversion facilities and capacity required, capital cost, operating cost, and summary of processing fees under Scenario E.

Table 12. Scenario E Recovery Tonnages Summary – Estimated Outcome in 2045

Scenario E	Estimated Outcome in 2045
Incoming Tons to New Recovery Facilities	4,200,000
Recovered Tons	3,900,000
Residue Tons	2,100,000
Traditional Recycling %	64%
Adjusted Recycling % with WTE and Landfill Credits	73%
GHG Benefit (MTCO2e)	1,820,000

Table 13. Scenario E New Diversion Facilities and Capacity Required, Capital Cost, Operating Cost, and Summary of Processing Fees (est. 2025 dollars)

Description	Qty	Capacity (Tons Per Year/Facility)	CapEx/ Facility	Annual OpEx/ Facility	Processing Fee ($/Ton)	Aggregated ($/Ton /Facility)
SS RMPF	2	250,000	$72M	$14M	$89	$35
CASP Compost Zones Incorporated in 2 Organics Facilities	10	73,000	$12M	$1.7M	$35	($80)
Pyrolysis	1	30,000	$10M	$700k	$57	$13
MWP Facility with Fiber Extraction	3	330,000	$363M	$30M	$194	$124
C&D RMPFs	2	450,000	$41M	$19M	$50	$60
Public Drop Off Centers	8	12,000	$140k	$1M	$86	$86
Transfer Stations	3	703,000	$33M	$25M	$82	$22
Landfill	1	2.5M	$979M	$203M	$95	$41

5.0 CURBSIDE COLLECTIONS CONSIDERATIONS

5.1 COLLECTION TRUCKS OVERVIEW

This Section provides an overview of key curbside collection considerations, focusing on the differences between the two most common types of collection vehicles and the growing adoption of alternative fuel vehicles. The primary curbside collection trucks in use across the United States today include Automated Side Loader (ASL) and Rear-End Loader (REL) vehicles.

Cost examples for both ASL and REL scenarios, along with the associated assumptions, are detailed in **Appendix B**. It is important to note that these cost models apply exclusively to curbside single-family households and do not account for collection costs in multi-family or commercial sectors.

In addition, many local governments are exploring the use of alternative fuel collection vehicles to advance sustainability goals, given their potential for significantly reducing greenhouse gas (GHG) emissions.

REL collections: REL solid waste trucks are designed for manual collections and are typically equipped with lifting mechanisms, such as cart lifters. In a standard collection program, these trucks are staffed with three personnel: one CDL driver and two collectors. The collectors manually handle the carts, using cart tippers to lift containers or unloading waste directly into the hopper, which serves as the initial receiving point. REL trucks are equipped with hydraulic systems that compact the waste, enabling increased capacity and faster route completion times.

REL collections are particularly well-suited for urban and densely populated areas due to their smaller operational footprint, which provides a significant advantage over fully automated side-loader trucks. Automated trucks require more space to maneuver, making them less effective in narrow alleys or streets with heavy on-street parking (RRS, 2024).

ASL: Fully automated collection vehicles provide a significantly safer working environment for employees, as they eliminate the need for workers to exit the vehicle during operation. Refuse and recyclable material collection ranks as the seventh deadliest job across all industries, according to the U.S. Department of Labor's Bureau of Labor Statistics (Quinn, 2023). The solid waste and recycling industry has consistently ranked among the top 10 industries with the most dangerous occupations, with a national average injury rate of 4.7 cases per 100 full-time equivalent workers in 2022 (Quinn, 2023).

This ongoing safety concern highlights the importance of prioritizing measures to protect collection workers.

By reducing the number of workers needed per route, ASL vehicles significantly lower the risk of injuries and fatalities. These vehicles allow a single operator to complete the route without leaving the driver's seat, if carts are correctly placed for the collection arm to access them. All servicing is conducted remotely, eliminating exposure to many hazards. Fully automated systems are compatible only with cart-based collection programs, as loose bags or other containers cannot be handled by the collection arm.

In addition to safety, fully automated systems address ergonomic concerns, such as back injuries and workplace illnesses caused by repetitive lifting or exposure to hazardous materials (e.g., needle sticks or viral pathogens). Advocacy groups like the National Council for Occupational Safety and Health (COSH) emphasize the need to eliminate workplace hazards rather than relying solely on safety measures dependent on worker actions, such as wearing high-visibility clothing. COSH warns that such measures may provide a false sense of security and fail to address the root cause of injuries.

While fully automated collection systems require higher initial capital investments for vehicles and carts, the long-term financial benefits can offset these costs. Savings from reduced workplace injury claims, lower insurance premiums due to minimized risks, and improved employee retention should be carefully considered. In contrast, semi-automated rear-load trucks, which require up to three staff members per vehicle, involve lower initial costs but higher labor requirements. Fully automated vehicles, which require only one (1) operator per truck, allow for labor reductions or the reallocation of personnel to other specialized collection programs, such as electronics, textiles, HHW, bulky waste, and C&D.

The primary advantage of fully automated vehicles is their significant improvement in worker safety. Collection workers face risks such as falls from trucks, being pinned, or truck rollovers (SWANA, 2023). Fully automated systems mitigate these hazards by eliminating the need for workers to ride on the back of vehicles or repeatedly enter and exit the truck. Additionally, they reduce repetitive lifting motions that often lead to long-term injuries. Operators remain safely inside the vehicle, using the automated arm to collect materials from the curb. Many municipalities that transition to fully automated collection report reduced workers' compensation claims and lower insurance costs.

Fully automated vehicles also offer operational efficiencies, with faster collection times. They can typically handle 1,000 to 1,200 collections per day per vehicle, compared to 800 to 1,000 collections for semi-automated trucks (Roberts, 2014). These efficiencies, combined with safety and cost benefits, make fully automated systems an attractive option for advancing solid waste collection programs.

Alternative Fuel and Electric Collection Vehicles

Beyond transitioning to automated collection vehicles, the use of alternative fuel and electric collection vehicles is a consideration for future fleet purchases that would result in additional environmental benefits. A Solid Waste Association of North America (SWANA) Applied Research Foundation study (the report), Evaluation of Electricity and Other Alternative Fuels for Solid Waste and Recycling Collection Vehicles, evaluates alternative fuels for waste collection vehicles, focusing on electricity, CNG, and hydrogen fuel cells (SWANA Applied Research Foundation, 2019). The report compares these alternatives to diesel, analyzing energy usage, greenhouse gas emissions, and costs. Electric trucks show the lowest cost per mile and emissions but are still in the demonstration

phase, hindering widespread adoption. Hydrogen fuel cell trucks also offer benefits but lack United States demonstration projects.

The report compares alternative fuels for refuse and recycling collection, as shown below.

Fuel Costs: Electricity is the least expensive fuel at $0.66 per mile. CNG is slightly more expensive at $1.14 per mile. Diesel costs $1.29 per mile. Hydrogen fuel cell truck is the most expensive option in regard to fuel costs at $2.05 per mile.

GHG Emissions: Electric refuse trucks emit the lowest amount of GHG at 2,115 grams of CO2e per mile. CNG trucks emit 4,079 grams of CO2e per mile. Diesel trucks emit 4,406 grams of CO2e per mile. Hydrogen fuel cell trucks emit the highest level of GHG gases at 11,003 grams of CO2e per mile.

- **Commercial Viability:** Diesel and CNG refuse trucks are fully commercialized. Electric refuse trucks are in the demonstration stage of commercialization. There are currently 50–100 demonstration projects in North America. Hydrogen fuel cell refuse trucks are in the early demonstration stage of commercialization. Demonstration projects are occurring in Europe, but not in the U.S.

- **Other Considerations:** Electric refuse trucks are quieter than diesel trucks and produce no tailpipe emissions. As such, there are environmental justice benefits with improved air quality and reduced human health impacts such as asthma for communities with significant truck traffic. Electric vehicles also use less energy than other alternative-fueled trucks. However, they have high upfront capital costs, require new charging infrastructure, and limited experience in real-world service environments. Hydrogen fuel cell refuse trucks also offer zero tailpipe emissions, regenerative braking capabilities, and low noise levels. They have driving ranges comparable to diesel trucks.

The report advises fleet managers to continue using diesel and CNG trucks while preparing to transition to renewable alternatives as they become cost competitive. It also recommends exploring opportunities to generate electricity and renewable CNG from solid waste (RNG). Implementation of AD for treatment of organic waste could provide an opportunity for onsite vehicle fuel use. For fleets considering electric trucks, the report suggests waiting until test project data has been analyzed before making the switch. In October 2024, Republic Services introduced an all-electric recycling and waste collection truck fleet in Louisville, Colorado, making it the first U.S. city to adopt a fully electric collection fleet.

5.2 SCENARIOS COLLECTIONS COSTS OVERVIEW

5.2.1 Scenario A – Restoring Single-Stream Recycling and adding Curbside Yard Waste Composting

MSW (1x/week) - In scenario A, the trash collection schedule would be reduced to once a week to accommodate the addition of yard waste collections. Using 2045 population numbers, the estimated annual cost for MSW collection and disposal, utilizing ASL collections once-a-week, is approximately $23 million, equating to $4.98 per household per month. Alternatively, conducting all collections with rear-end loaders would cost approximately $48 million annually, or $10.07 per household per month. These costs are already accounted for and do not represent additional expenses under this scenario. Reducing the trash collection to once a week would result in savings of approximately

$5.34 per household per month, which would support the added costs of adding in yard waste composting collections,

Single-Stream Recycling (1x/week) – Restoring SSR services to the 20% of residents currently without access is estimated to cost approximately $3.7 million annually, or $3.88 per household per month, utilizing ASL collection vehicles. This cost would be allocated solely to the households receiving the restored service. If rear-end loaders are utilized, the cost would be approximately $7 million annually, or $7.46 per household per month.

Yard Waste Composting (1x/week) – Implementing yard waste collection services is estimated to cost $19 million annually, or $4.00 per household per month. The proposed service would be containerized, with each household receiving a 95-gallon cart for yard waste. Additional cart size options may be offered, and households may also have the option to use paper bags for collection. For estimation purposes, REL vehicles, rather than ASLs, are assumed for this service to accommodate the manual collection of paper-bagged and/or containerized/bundled yard waste.

The costs for yard waste collection will be distributed across all Authority households, with participation rates anticipated to be approximately 80%. Due to the seasonal nature of yard waste generation and the variability in yard sizes, the volume of yard waste collected along with the number of households serviced per route are typically greater than those for MSW or SSR.

Food Waste Composting (Special Collections) – Scenario A assumes the collection of food waste through the establishment of drop-off events or centers where residents can bring food waste on a weekly basis. The contractor is responsible for setting up and dismantling the events each weekend and provides up to two attendants per site, depending on market size and traffic, to educate residents about composting. Residents can deposit acceptable food waste at no cost, and compost caddies are distributed during program launch events or Earth Month activities to encourage participation.

Education – The recommended education costs for materials management programs are incorporated into the scenario based on The Recycling Partnership's (TRP) guidance of $10 per household annually (Bandhauer et al., 2021).

Table 14 presents estimated collection costs under Scenario A.

Table 14. Estimated Collection Costs under Scenario A

Collection Description	# of Residents	Annual Total	$/HH YR	$/HH/Month
Reduce MSW (1x/week)	390,000	($25,300,000)	($64.87)	($5.41)
Restore SSR (1x/week)	80,000	$3,700,000	$46.25	$3.85
Add Yard Waste Composting (1x/week)	390,000	$18,900,000	$48.46	$4.04
Add Food Waste Drop-Off (x1/week)	390,000	$1,700,000	$4.36	$0.36
Education	390,000	$3,900,000	$10.00	$0.83
Total		**$2,900,000**	**$44.20**	**$3.68**

5.2.2 Scenario B – Adding Curbside Food Waste Composting Collections

MSW (1x/week) - In Scenario B, reducing MSW collection to once a week would result in cost savings that could be used to support the implementation of new programs and services. This reduction is estimated to save approximately $20 million annually, which translates to an average savings of about $5.34 per month per household.

Single-Stream Recycling (1x/week) – Restoring SSR services to the 20% of residents currently without access is estimated to cost approximately $3.7 million annually, or $3.88 per household per month, utilizing ASL collection vehicles. If REL are utilized, the cost would be approximately $7 million annually, or $7.46 per household per month. This cost would be allocated solely to the households receiving the restored service.

Yard Waste Composting (1x/week) – As discussed in Scenario A, implementing yard waste collection services is estimated to cost $19 million annually, or $4.00 per household per month.

Food Waste Composting (1x/week) – Scenario B includes an opt-in food waste curbside composting collection once a week. The customer would bear the costs, estimated at $7.46 per month. In this scenario, it was assumed a participation rate of 20%.

Education – The recommended education costs for materials management programs are incorporated into the scenario based on TRP guidance of $10 per household annually (Bandhauer et al., 2021).

Table 15 presents estimated collection costs under Scenario B.

Table 15. Estimated Collection Costs Under Scenario B

Collection Description	# of Residents	Annual Total	$/HH YR	$/HH/Month
Reduce MSW (1x/week)	390,000	($25,300,000.00)	($64.87)	($5.41)
Restore SSR (1x/week)	80,000	$3,700,000.00	$46.25	$3.85
Add Yard Waste Composting (1x/week)	390,000	$18,900,000.00	$48.46	$4.04
Opt-In Food Waste (1x/week)	80,000	Costs to customer		
Education	390,000	$3,900,000.00	$10.00	$0.83
Total		**$1,200,000**	**$39.84**	**$3.32**

5.2.3 Scenario C – Co-Collecting Food Waste and Yard Waste

MSW (1xweek) - In Scenario C, MSW collection is also reduced to once-a-week, resulting in cost savings that could be used to support the implementation of new programs and services. This reduction is estimated to save approximately $20 million annually, which translates to an average savings of about $5.34 per month per household.

Single-Stream Recycling (1x/week) – Restoring SSR services to the 20% of residents currently without access is estimated to cost approximately $3 million annually, or $3.88 per household per month, utilizing ASL collection vehicles. If REL are utilized, the cost would be approximately $7 million annually, or $7.46 per household per month. This cost would be allocated solely to the households receiving the restored service.

Food & Yard Waste Composting (1x/week) – Co-collecting food and yard waste with strong engagement and education efforts, policies such as mandatory organics recycling, and enforcement, can yield capture rates as high as 70-85% (Portland, OR, Seattle WA, and San Francisco, California) with 90% plus participation. The model assumes an 85% participation rate for single-family households, 40% for multifamily households, and 50% for commercial businesses.

Education – The recommended education costs for materials management programs are incorporated into the scenario based on TRP guidance of $10 per household annually (Bandhauer et al., 2021).

Table 16 presents estimated collection costs under Scenario C.

Table 16. Estimated Collection Costs Under Scenario C

Collection Description	# of Residents	Annual Total	$/HH YR	$/HH/Month
MSW (1x/week)	390,000	($25,300,000.00)	($64.87)	($5.41)
SSR (1x/week)	80,000	$3,700,000.00	$46.25	$3.85
Food + Yard (1x/week)	390,000	$20,100,000.00	$51.54	$4.29
Education	390,000	$3,900,000.00	$10.00	$0.83
Total		**$2,400,000.00**	**$42.92**	**$3.58**

5.2.4 Scenario D – Wet/Dry MSW Collection, Single-Stream, and Co-Collection of Food + Yard Waste

Wet MSW (2x/week) – Scenario D modifies the current twice-a-week MSW collection schedule by converting into two separate collections: Wet (twice-a-week) and Dry (once-a-week). This approach would not require additional vehicles, nor would it increase maintenance, repair, or fuel costs. However, the added expense comes from the need for an additional cart, along with the costs associated with cart distribution and maintenance to support the separation of MSW. These costs are outlined below under the Wet MSW line item.

Dry MSW (1x/week) – As described in 5.1.4 Scenario D, the SSR would no longer be collected separately, but would instead be integrated into the Dry MSW once-a-week to optimize the number of hauling streams required under this scenario. This assumes that the current recycling cart is utilized for the dry MSW collections. To ensure all residents of the Authority have access to this service, the 20% of residents currently without SS will need to be added. This addition is estimated to cost approximately $3 million annually, or $3.88 per household per month, utilizing ASL collection vehicles. This cost would be allocated solely to the households currently not receiving recycling services.

Yard Waste Composting (x1/week) – As discussed in Scenario A, implementing yard waste collection services is estimated to cost $19 million annually, or $4.00 per household per month.

Education – The recommended education costs for materials management programs are incorporated into the scenario based on TRP guidance of $10 per household annually (Bandhauer et al., 2021).

Table 17 presents estimated collection costs under Scenario D.

Table 17. Estimated Collection Costs Under Scenario D

Collection Description	# of Residents	Annual Total	$/HH YR	$/HH/Month
Wet MSW (2x/week)	390,000	$-	$-	$-
Dry MSW (1x/week)	80,000	$3,700,000.00	$46.25	$3.85
Yard (1x/week)	320,000	$18,900,000.00	$59.06	$4.92
Education	390,000	$3,900,000.00	$10.00	$0.83
	Total	**$ 26,500,000.00**	**$115.31**	**$9.61**

5.2.5 Scenario E – Mixed Waste Technologies and Fiber Capture

Scenario E maintains the same levels of service and collection efforts as Scenario C, with the key difference being that MSW would be transported to a MWP Facility prior to disposal. Existing transfer stations could be utilized for this purpose; however, the logistics of hauling waste from these transfer stations to the new MWP Facility will need to be considered.

MSW (1x/week) - In Scenario E, MSW is hauled to the MWP Facility and includes fiber extraction.

Single-Stream Recycling (1x/week) – Restoring SSR services to the 20% of residents currently without access is estimated to cost approximately $3 million annually, or $3.88 per household per month, utilizing ASL collection vehicles. This cost would be allocated solely to the households receiving the restored service.

Food & Yard Waste Composting (1x/week) – Co-collecting food and yard waste with strong engagement and education efforts, policies such as mandatory organics recycling, and enforcement can yield capture rates to as high as 70-85% (Portland, OR, Seattle WA, and San Francisco,

California) with 90% plus in participation. The model assumes an 85% participation rate for single-family households, 40% for multifamily households, and 50% for commercial.

Education – The recommended education costs for materials management programs are incorporated into the scenario based on TRP guidance of $10 per household annually (Bandhauer et al., 2021).

Table 18 presents estimated collection costs under Scenario E.

Table 18. Collection Costs Under Scenario E

Collection Description	# of Residents	Annual Total	$/HH YR	$/HH/Month
MSW (2x/week)	390,000	($25,300,000.00)	($64.87)	($5.41)
SSR (1x/week)	80,000	$3,700,000.00	$46.25	$3.85
Food & Yard (1x/week)	390,000	$20,100,000.00	$51.54	$4.29
Education	390,000	$3,900,000.00	$10.00	$0.83
	Total	**$2,400,000**	**$43.40**	**$3.62**

6.0 FACILITIES OVERVIEW

Section 6 of this White Paper summarizes the estimated costs tied to the solid waste and processing facilities needed by the Authority to execute the scenarios presented in Section 4. The analysis includes key cost factors such as facility capacity, size, capital equipment, operational needs, and related expenses. It also breaks down financial metrics like the cost per ton of waste processed and the cost per household. Given that the number of facilities required for each scenario is different, the conceptual facility costs are summarized below for **each** facility. Revenue estimates include tip fees generated from respective facilities and sales of commodities (e.g., finished compost, sorted recyclable, RNG sales, etc.).

Table 19 presents the estimated new processing facility capital summary. Please note, the **cost of land is excluded** in the summary below as there are multiple ways of funding and financing new facilities. No decisions have been made with respect to which facilities will be constructed and whether they will be owned by the Authority or managed through a Public-Private Partnership (P3). These estimates are planning level estimates intended to be used in comparing the scenarios and assisting in the decision-making process.

Table 19. New Processing Facility Capital Summary

Facility (Each)	Space (Acres)	TPY	CapEx[e]	OpEx	Revenue	Processing $ /Ton (OpEx + CapEx)	Net$/Ton/ Facility
SS RMPF	20	250,000	$72M	$14M	($13.5M)	$89	$35.14
Mulch Facility	10	175,000	$5M	$1.8M	($8.2M)	$14	($32.17)
Compost Facility (CASP)[a]	10	73,000[a]	$12M	$1.7M	($10.4M)	$35	($80.43)
Biochar (YW)	2	30,000	$10M	$700k	($1.7M)	$70	$13.48
AD	7	160,000	$64M	$10M	($8.4M)	$100	$47.66
C&D RMPF	15	450,000	$41M	$19M[b]	($2.3M)	$50[b]	$60[c]
Dry MRF	15	160,000	$49M	$18M	($13.3M)	$116	$61
MWP Facility (Fiber Extraction Dry MRF + AD + MRF)	30	330,000	$363M	$30M	($23M)	$194	$124
Public Drop-Off Centers	0.5	12,000	$140k	$1M	Negligible	$86	$86
Transfer Stations[d]	15	3,120,000	$140M	$156.5M	$187M	$84	$24
WTE	30	1M	$900M	$14.4M	$32.6	$14	$147
Landfill	640	3,4M	$814M	$261M	$435M	$89	$41

[a] Total mix throughput is 90,000 tons per year consisting of 36,000 tons per year of food waste, 37,000 tons per year of yard waste, and 17,000 tons per year wood chips (obtained separately from the recovered organic waste stream).
[b] Includes cost of disposal (transfer and disposal to landfill) and fines management.
[c] Assumes 80% Capacity of C&D Facility.
[d] Assumes the largest capacity needed under all scenarios and three (3) facilities and excludes vehicles.
[e] CapEx cost excludes land acquisition as well as any site-specific considerations.

Table 20 presents the projected number of new facilities for each scenario.

Table 20. Number of New Facilities per Scenario

Technology	Number of Facilities per Scenario				
	A	B	C	D	E
SS RMPF	2	2	2		2
Organics Processing Campus	2	2		2	
AD Food Waste (FW)				3	
Yard Waste (YW) Mulch Windrow	2	2		2	
FW/YW Compost (CASP)		1	10*		10*
Biochar YW (optional)	1	1	1	1	1
MWP Facility					3
Dry MRFF				6	
C&D RMPF	2	2	2	2	2
Public Drop-Off Recycling Facility	8	8	8	8	8
Transfer Stations	3	3	3	3	3
WTE		1	1		
Landfill	1	1	1	1	1

*The 10 Food waste/Yard Waste CASP zones will be part of two (2) organics processing facilities.

6.1 FACILITIES IMPLEMENTATION TIMELINES

Please note that the timelines below are for illustrative purposes only. Each type of facility may differ based on the time and complexity of the project. For most of the required infrastructure, there will be combinations of facilities (transfer stations and processing facilities) which are combined on one site to eliminate costs in permitting, site development, logistics, and operations. **Table 21** presents the facility implementation description, action, and timelines.

Table 21. Facility Implementation Description, Action, and Timelines

Action	Description	Timeline
Permitting	Solid waste permitting, licensure, and special (e.g., wetlands, antiquities, EJ concerns)	6 to 36 months
Funding	Bond issues, Grants and/or Fund availability	6 to 18 months
Procurement	Request for Qualifications (RFQ)/Request for Proposals (RFP) process, vendor selection, contracting	6 to 24 months

Action	Description	Timeline
Preliminary Design	Site, building and equipment layout and selection by Authority/Owner's engineer	6 to 18 months
Equipment Manufacture	Facility equipment, specialty facility components	24 to 36 months
Site/Building Design and Manufacture	Assume pre-engineered	9 to 12 months
Site Construction	Initial site grading and preparation	6 months
Building Construction	Engineer and erect building including concrete foundation and walls	6 to 12 months
Equipment Installation	Dependent upon complexity of facility and equipment	Up to 18 months
Acceptance Testing	Dependent upon the complexity of the facility	Up to 30 days or longer

The Authority must account for potential delays due to power outages, flooding, and hurricane cleanup as part of its contingency planning. During the COVID-19 pandemic, equipment delivery times reached up to 26 months following contract approval. While current delivery times have improved, they still range from approximately 12–18 months for complete systems and 10–14 months for individual sorting components.

The project timeline will vary significantly depending on the entity responsible for final design and the stages at which various approvals are required. A critical factor is determining the extent of government involvement in siting, ownership, and operation. This decision influences the timing of subsequent government actions at each stage, with each decision potentially adding months to the overall timeline.

6.1.1 Single-Stream RMPF

As previously outlined, the Authority currently processes its SSR at the Reuter Facility. Processing fees for this facility range from $90 to $200 per ton, depending on community contracts. WM is in the process of constructing a new, state-of-the-art, 127,000 square foot RMPF adjacent to the existing site. This $80+ million RMPF will have a processing capacity of 66 TPH, equivalent to 260,000 TPY, and is referred to as the WM South Florida Facility.

To prepare for increased SS recyclable volumes anticipated by 2045, the following processing options are outlined for consideration:

1. **Leverage Existing Private Infrastructure**
2. **Issue a New Solicitation for Private RMPF Development**
3. **Pursue a P3 for a Public RMPF in Collaboration with a Neighboring Jurisdiction**

It is important to note that additional capacity exists in nearby counties. For example, WM and Lee County are expanding SS processing capacities to 60 TPH (equivalent to 260,000 TPY), which could be accessed through transfer agreements.

6.1.1.1 Strategic Options for Long-Term Single-Stream Recycling Needs

To address future requirements and ensure cost efficiency, the Authority should employ competitive procurement processes to explore the following options:

Option A: Maintain the Status Quo - Continue utilizing the WM Reuter Facility and the adjacent new WM South Florida Facility that will replace it after construction is completed. While straightforward, this approach may lead to higher processing fees unless alternative strategies are pursued to foster market competitiveness.

Option B: Issue a Competitive RFP for Private RMPF Development - Release an RFP inviting private entities to establish a new RMPF within the boundaries of Broward County. This option aims to promote cost efficiency through competition and market expansion.

Option C: Develop a Regional Public RMPF or P3 - Collaborate with other units of government outside of Broward County to procure a regional public RMPF. A P3 approach would optimize resources, increase processing capacity, and capitalize on cost-sharing opportunities and economies of scale.

6.1.1.2 Considerations for Implementation

Each option offers distinct advantages and challenges in terms of cost, operational efficiency, and long-term sustainability. It is likely that a combination of these strategies will be required to meet the Authority's evolving waste management goals while providing cost-effective and environmentally responsible service to its residents.

Additionally, constructing a new SS RMPF can be approached through various models. The table below provides an overview of the estimated capital and operational costs for a new facility with a capacity of 250,000 TPY (60 TPH). **Table 22** presents the estimated capital and operating costs of a new 250,000 TPY RMPF.

Table 22. Estimated Capital and Operating Costs of a New 250,000 Ton Per Year Facility

Single Stream RMPF	Estimated Cost	Description
Total Throughput (per site)	250,000 TPY	Inbound SS recyclable tons including residue
Capital Cost (per site)	$72,000,000	Includes the cost of construction, RMPF equipment, and rolling stock. Excludes the cost of land.
Annual Facility Cost	$22,300,000	OpEx plus annualized CapEx
Estimated Revenues	($13,500,000)	Estimated generated revenues ($54.52/ton using a 10-yr AVG of South East ACR)*
Average Cost Per Ton	$35	Includes operating cost and annualized capital costs spread over incoming tons

*Assumption: Cost of disposal of residue at $82.50 per ton (average between Class I landfill and WTE fees).

6.1.2 Organics Processing Facilities

Siting facilities for organics processing presents several challenges, primarily due to the high cost and limited availability of suitable land.[10] Additionally, transporting organic materials over long distances is less cost-effective due to their high moisture content. Facility locations must also consider potential community concerns regarding odor and traffic impacts. Based on these considerations, two potential sites have been identified for organics processing facilities: Reuter Facility site in Pembroke Pines and the Broward County Landfill site.

Each facility will utilize a tailored mix of technologies to efficiently process the quantity and composition of recovered organic materials while responding to market demands. Mulching is recommended for processing yard waste independently, as it is the simplest and most cost-effective method. Composting is necessary for food waste to ensure stabilization, pathogen control, and odor reduction, while also producing a valuable product to recycle nutrients and improve soil health. Yard waste, when combined in appropriate proportions with food waste, can serve as a bulking agent and a carbon source, enhancing the composting process.

The market for mulch and soil amendments in Broward County is limited. Estimates using the Mulch & Soil Council methodology suggest a total market size of approximately 74,000 TPY for mulch and 33,000 TPY for soil amendments such as compost and topsoil.[11] However, recycled organic waste-based mulch and compost face competition from traditional wood mulch and premium organic compost products. Additionally, the high concentration of palm material in regional yard waste poses challenges to degradation during processing.

To address these challenges and improve the viability of organics processing by the Authority, several additional strategies are recommended:

- **Pyrolysis Unit:** Incorporating a pyrolysis unit to process hard-to-decompose organic material, such as palm waste, into biochar. Biochar offers additional market opportunities and supports soil health initiatives.

- **Colorizing Process:** Adding a colorizing step to enhance the aesthetic appeal of recycled mulch products, increasing market competitiveness.

- **Trained Salesforce:** Employing a highly trained salesforce to promote end products effectively, ensuring market penetration and customer education.

By implementing these measures, the Authority can develop a more robust and sustainable organics processing system that addresses existing challenges and maximizes resource recovery.

It's important to note that, in Florida, a solid waste management facility that produces compost or mulch is required to be permitted pursuant to Section 403.707, F.A.C, and in accordance with Rule 62-709, Florida Administrative Code. The permitting application requires details on the facility design (e.g., dimensions of the site, plan for receiving/production/curing), facility performance and design

[10] A search conducted on 12/11/2024 showed no agricultural land available.
[11] The report produced for Miami-Dade County by Townsend et al., 2021, assumes 74% of U.S. households have a yard or garden and 24% of these households purchase mulch. The average household that purchases mulch will purchase 24-30 ft^3. For every yd^3 of bagged mulch sold per year, approximately two (2) yd^3 of bulk mulch is sold. Finally, soil products are about 40% of mulch volume in unit sales. According to 2019 Census information, the number of single-family households in Broward County is 349,006.

standards, operational features, operations plan, water quality, compost facility data, and certification by an engineer or public officer.

Table 23 presents the operations or zones needed across the organics processing facilities for each scenario.

Table 23. The Operations or Zones Needed Across the Organics Processing Facilities to Meet Recovered Organics under Each Scenario

Technology	Number of Facilities per Scenario				
	A	B	C	D	E
AD FW	0	0	0	3	0
YW Mulch Windrow	2	2	0	2	0
FW/YW Compost (CASP)	0	1	10	0	10
Biochar YW (Optional)	1	1	1	1	1

6.1.3 Windrow Mulch

Broward County, like many Florida counties, generates a significant amount of yard waste. An analysis conducted by the University of Florida in 2021 analyzed treatment of yard waste for Miami-Dade County (Townsend et al., 2021). The study concluded that mulching yard waste was more economical than composting yard waste given market conditions in the region.

Mulching is the simplest, least expensive treatment for yard waste. It is practiced by several Florida counties (e.g., Hillsborough, Sarasota, Lee), as a means for diverting yard waste from landfill.

To accommodate the maximum yard waste, two mulching operations should be sited, one at each Organics Processing Campus, each with a capacity of 175,000 TPY.

Table 24 presents the characteristics of a windrow mulch operation.

Table 24. Characteristics of a Windrow Mulch Operation

Windrow Mulch Operation Characteristics	Target Facility
Mass Throughput TPY	175,000
Volume Throughput Yd^3/Year[a]	360,600
Volume Throughput Per Day Yd^3/Day[b]	1,387
Mass Output Tons/Year[c]	140,000
Volume Output Yd^3/Year[b]	280,000
Volume Output Per Day Yd^3/Day[c]	1,077

[a] Density of mixed yard waste 1,000lbs/yd^3
[b] Shrink factor during mulching 20% (includes 1% residuals)
[c] Assumes 260 operating days/yr

Table 25 presents the facility design parameters for a yard waste mulching operation.

Table 25. Facility Design for Yard Waste Mulching

Equipment Units Needed[a]	Count
Tub Grinder Total Units	3
Front End Loader Total Units	3
Post Trommel Total Units	2
Personnel Needed	TBD
Operators Needed Total Employees	23
Managers Needed Total Employees	9
Trained Salespeople	2
Total Facility Footprint (Assuming New Site)	
Graded Area Total Acres	10-18
Mulching Operation Footprint	
Pile Length ft	536
Total Receiving Area Acres	0.37
Storage Area Sizing	
Pile Length ft	430
Total Receiving Area Acres	0.30
Total Volume and Area Sizing	
Total Area (Based on Daily Flow) Acres	3

[a]Extrapolated from Table 6-11 (Townsend et al., 2021)

Factors and Parameters:

Buffer Area 500ft
Support Area Ratio 2
Cross Sectional Ratio 0.5 to 0.66
Pile Dimensions 4'H X 30'W

The mulching process begins with grinding the yard waste using a tub grinder to a coarse size, which is then screened to remove contaminants and formed into long narrow piles (windrows). Mulching is more efficient in terms of time, land, and resources compared to windrow composting which involves more turning and a curing period. However, the quality of the mulch and demand for mulch may limit marketability. Advanced screening processes using multiple screen sizes can be used to remove contaminants like plastic and metals. Curing time in the pile can allow the mulch to reach an optimal temperature to destroy weeds or invasive seeds.

Conceptual capital cost parameters for a yard waste windrow mulching facility are presented in **Table 26**.

Table 26. Capital Cost Parameters Used to Estimate Cost of Constructing Yard Waste Windrow Mulching Facility

Equipment	$/Unit[a]	Equipment life
Tub Grinder[a]	$430,000	10
Front End Loader[a]	$260,000	10
Post Trommel[a]	$170,000	10
Colorizing Equipment[b]	$200,000	10
Facility [a,c]	Units	
Grading Cost Per Acre $/acre	$14,700	
Grading Requirement acre/TPD	0.022	
Engineering, Design, Supervision % Direct Project Costs	15%	
Management Overheads % Direct Project Costs	10%	
Commissioning % Indirect Project Costs	5%	
Contingency % Indirect Project Costs	10%	
Contractor's Fees % Indirect Project Costs	10%	

[a] Based upon Table 6-12 adjusted to 2025 US$ (Townsend et al., 2021).

[b] For information on mulch colorizing equipment, refer to the Soil and Mulch Producers News article found in https://www.soilandmulchproducernews.com/mulch-coloring-equipment-an-investment-that-will-increase-your-mulch-sales/ (Heller, 2020).

[c] Land acquisition costs are not included.

Due to the market challenges discussed, it is not uncommon in Florida for yard waste mulch to be given away free to residents. In fact, yard waste mulch may be provided to residents for free at additional Drop-Off Centers discussed in Section 6.1.11. The UF study modeled the revenue from mulch to range from $0-$10.29 per ton (Townsend et al., 2021). Colorization processing can be used to increase the marketability of the yard waste-derived mulch, and a well-qualified sales staff (two of whom are included in the operating expenses) can drive sales and other utilization opportunities. Therefore, a value of $5 per ton of mulch was assumed. The facility is assumed to receive $42 per ton in tipping fees for the yard waste which is also considered revenue.

Table 27 presents a per ton cost summary for each windrow mulching operation.

Table 27. Summary Costs Per Ton Input for Each Windrow Mulching Operation

Capital Costs	($/ Ton)
Equipment	$1.27
Grading and Engineering cost[a]	$1.28
Total Capital Costs	**$2.62**
Operating Costs	**($/ Ton)**
Equipment maintenance	$0.68
Facility energy use	$2.97
Personnel	$6.59
Total Operating Costs	**$10.25**
Capital & Operating Costs	**$14.47**
Revenue	**($/Ton)**
Value of mulch product (high quality) – bulk[b]	$4.64
Tipping Fees	$42.00
Total Revenue	**($46.64)**
Capital + Operating Costs – Rev	**($32.17)**

[a] May not be required for existing, permitted site
[b] Adjusted to per ton of input YW.

6.1.4 Biochar Pyrolysis Unit

Pyrolysis to produce biochar is gaining popularity as a technology to manage high carbon content solid waste including yard waste. For example, pyrolysis is well suited to convert palm fronds which can be difficult to decay via composting into biochar. Biochar is a carbon-rich material produced by heating organic matter in the absence of oxygen. The structure and properties of biochar make it a desirable soil amendment as well as suitable for certain industrial applications. Biochar has numerous applications, including as a soil amendment, due to its ability to improve water retention and promote microbial activity. Biochar is commonly added at 5% to 10% by weight to compost to increase its value. Studies have also shown that biochar can promote microbial activity to improve aerobic and anaerobic processes, potentially reducing compost times and increasing biogas production respectively. Biochar also possesses properties that make it suitable for filtration, construction, and various industrial applications, including potentially treating PFAS. Pyrolysis also has shown promise as a method to destroy PFAS, particularly in low moisture feedstock (Keller et al., 2024). (See Task 9 Innovative and Future Technologies White Paper.)

A biochar operation with a capacity of 30,000 TPY of yard waste is included in the organics' facility scenarios. Capital expenses are estimated to be $10 million including a pyrolysis unit and a rotary dryer. Operating expenses are estimated to be $700,000 per year. This includes equipment

maintenance costs at 2.5% of capital expense, 8- to 12-hours per day of labor for operation and maintenance, and utility costs. Pyrolysis units are recommended to be run continuously for a minimum of 8,000 hours per year.[12]

The process is expected to produce approximately 2,250 tons of biochar annually. Biochar has a wide range of applications and can be marketed to several end-use sectors. Potential uses include integration into the existing organics processing operation, such as incorporation into the CASP or AD processes or blending with finished compost to enhance its value and marketability.

To determine the optimal use of biochar, an analysis of current market conditions and operational requirements is essential, recognizing that these factors may evolve over the project's lifespan. For conceptual cost estimates, it is assumed that the biochar will be sold for industrial or commercial applications.

Biochar pricing varies widely based on factors such as region, quality, and shipment size. Lower prices are typical for bulk purchases, with a general range of $200–$1,000 per metric ton (Elias et al, 2022). For this analysis, a conservative value of $200 per ton is applied for biochar. The carbon contained in biochar is highly stable and resistant to degradation, allowing it to remain in soil for over a thousand years. As a result, biochar production is considered carbon-negative because it sequesters carbon that would otherwise be released into the atmosphere during biomass decomposition.

Although biochar may qualify for Biochar Carbon Removal (BCR) credits, and the BCR credit market is currently performing well, no revenue from these credits is assumed in this analysis to maintain a conservative estimate. Conceptual capital and operating costs and cost per ton parameters for a biochar processing facility are presented in **Table 28**.

Table 28. Capital and Operating Costs and Costs Per Ton for Organics Facilities

Capital Costs		($/ Ton)
Modular Pyrolysis Unit	$5,640,000	$6.27
Rotary Kiln Dryer	$5,680,000	$13.33
Total Capital Costs	$11,320,000	**$19.60**
Operating Costs		($/ Ton)
Total Operating Costs	$660,000	**$22.01**
Capital & Operating Costs	$2,100,000	$70.48
Revenue		**($/ Ton)**
Biochar	$450,000	$15.00
Tipping Fees	$1,260,000	$42.00
Total Revenue	$1,710,000	57.00
Capital & Operating Costs – Revenue		**$13.48**

[12] Pyrolysis units are optimally run continuously or greater than 8,000hr/yr. If a correctly sized unit is not available, then the capital and operating costs may vary.

6.1.5 Covered Aerated Static Pile Composting

CASP composting is one of the most cost-efficient and straightforward methods for processing large volumes of food-based organic waste. This method is particularly suited for materials with high moisture content, a greater propensity for odor generation, and "messy" organic waste streams.

6.1.5.1 Key Features of Covered Aerated Static Pile Composting

- **Aeration System:** CASP composting utilizes an aeration system to circulate air through the composting mass. Depending on factors such as incoming material composition, site geography, and operator preference, either positive or negative aeration systems can be implemented:
  - **Negative Aeration:** Draws air into the pile, effectively managing odors. This method requires biofilters to treat emissions and volatile organic compounds (VOCs).
  - **Positive Aeration:** Pushes air through the pile and is commonly used. The pile is typically covered with a synthetic fabric or a biofilter layer (e.g., finished compost or wood chips) to retain heat, maintain moisture, and reduce odors and emissions.
- **Enhanced Degradation:** By introducing airflow, CASP systems maintain aerobic conditions, optimal moisture levels, and temperatures conducive to microbial activity, maximizing degradation efficiency while minimizing pathogens.
- **Operational Simplicity:** Unlike windrow composting, CASP systems do not require pile turning, as airflow provides necessary oxygenation. However, piles must be moved between phases, reducing overall operational costs.
- **Odor and Emission Control:** Controlled airflow and covers help mitigate odors and emissions, minimizing the facility's impact on neighboring areas.
- **Stormwater Management and Visual Appeal:** CASP systems improve stormwater runoff quality by preventing rainwater from contacting decomposing waste. Covered systems also enhance the visual appeal of composting facilities.

6.1.5.2 Composting Process and Phases

CASP composting typically takes three to six months to produce finished compost, proceeding through the following phases:

1. **High-Rate Active Composting:** 21–28 days
2. **Maturation/Curing:** 14–28 days
3. **Finishing (Optional, Uncovered):** 14–28 days

6.1.5.3 Infrastructure and Operational Requirements

CASP systems require a range of infrastructure and equipment, including:

- Aeration components: blowers, relay panels, electrical service, power panels, and switchboards.
- A concrete pad for active composting.

- Optional concrete bin blocks for containment and waterproof covers for controlling air and moisture levels.
- Front-end loaders for moving material between phases.

6.1.5.4 Preliminary Cost and Capacity Estimates

A CASP facility capable of processing 73,000 TPY of organics (36,000 TPY food waste and 37,000 TPY yard waste) requires an additional 17,000 TPY of wood chips for bulking, achieving optimal carbon-to-nitrogen ratios and moisture content. This brings the total processing capacity to 90,000 TPY. It is assumed wood chips will be sourced at no cost from commercial and industrial drop-offs or storm debris.

Each 90,000 TPY CASP operation will require approximately 8–12 acres, including:

- Feedstock receiving and storage areas
- Active composting and curing pads
- Finished compost storage and distribution areas
- Stormwater management systems
- Space for pile movement, screening, and grinding

Site development costs such as land acquisition, surveys, engineering, roads, utilities, water management systems, and buffering are not included in this preliminary estimate, as they will depend on the selected site.

6.1.5.5 Example Facility Design

An active composting pad with 46–52 zones (26 feet wide x 80 feet long x 10 feet high) can accommodate 35,000 cubic yards at a time. With a 45-day cycle and an average material density of 670 pounds per cubic yard, this design supports 90,000 TPY throughput.

The table below summarizes the site size and staffing requirements for a facility with a 90,000 TPY capacity.

Table 29 presents site sizing and staffing requirements for a CASP composting facility.

Table 29. Site Size and Staffing Requirements for CASP Facilities

CASP Facility Characteristics	Units
Total Throughput - CY Per Year	262,000
Total Throughput - Tons Per Year	90,000
Total Site Area – Acres	8-12
Total Composting Pad Area – Acres	3-4

CASP Facility Characteristics	Units
Active Composting Time – Days	45
Equipment – Pieces	9
Staff – FTE (including two equipment operators, scale operator, mechanic and supervisor)	5
Total Marketed Material – CY	105,000
Total Marketed Material – Tons	37,300

Table 30 presents the equipment requirements and estimated capital costs for a CASP composting facility.

Table 30. Equipment Requirements and Estimated Capital Costs for CASP Facilities

Equipment	Estimated Capital Cost	Notes
Rolling Stock/Portable Equipment		
Loader – Large Bucket Capacity	$325,000	Volvo L120H, or Similar
Loader – Medium	$165,000	Volvo L20 or Caterpillar 928 HZ
Grinder	$515,000	Doppstadt AK315 Grinder, or Similar
Screener	$325,000	Doppstadt SM617.2, or Similar
Dump Truck	$50,000	
Service Truck	$50,000	
Pickup Truck	$35,000	Silverado 2500 Work Truck, or Similar
5,000 Watering Tank and Trailer	$15,000	Assumed Used from Construction Sales
Air Compressor	$250,000	
Small Tools/Initial Parts	$5,000	
Permanent Equipment		
Scale	$100,000	Included in Site Development Costs
Cover (i.e. Gore)	$2,300,000	Included in Site Development Costs

Table 31 presents the estimated capital and operating costs and associated revenues for the CASP composting facility. Even at an overall estimated capital costs of $12.1M, with the tip fees and compost sales, the net revenue of the facility is $80.43 per ton of incoming material. The costs assume:

- Expected revenue for the sale of 80% of the finished compost each year at $30 per calendar year for bulk loaded and $5.33 per 30-pound bag (assuming 50% is sold bulk and 50% is sold bagged).
- Up to 17,000 tons of wood chips are provided at no cost, or from the mulching/grinding operation. The wood chips are added as bulking agent to the food waste and yard waste mix.
- A tipping fee of $42 per ton for any feedstock (this is less than the $50 per ton landfill tip fee in the area).
- The cost of land purchase is NOT included.
- The CASP pad of 3-4 acres is constructed of engineered concrete.
- The rest of the site is constructed of engineered gravel.

Table 31. CASP Facility Costs

CASP Facility Costs	Units
COSTS	
Equipment Capital ($)	$1,800,000
Site Development and Building Capital ($)	$10,4004,000
Total Facility Capital Cost	$12,0100,000
Total Annualized Cost of Capital ($)	$1,500,000
Total Annual Operating Cost - Labor, Maintenance, Equipment, Disposal ($)	$1,700,000
REVENUES	
Tip Fees	($3,100,00)
Compost Sales	($7,300,0000)
Total Annual Revenues	($10,400,000)
Capital Operating Costs – Rev ($/Processed Ton)	($80.43)

* The projected compostable material tip fee is less than landfill yard trash tip fee of $50 per ton resulting in community savings.

6.1.6 Anaerobic Digestion Facility

The initial development of AD in North America has primarily focused on co-digestion applications at farms and wastewater treatment facilities, targeting industrial and commercial food waste with low solids content. A regional example is the North Regional Wastewater Treatment Plant (NRWWTP) in Pompano Beach, Florida. However, the use of AD for MSW is gaining traction as a key technology for achieving organic waste diversion targets. One prominent example is Ontario, Canada's food waste management system, which integrates the DRUMBO food processing facility with the London biodigester to process over 150,000 tons of MSW and industrial source-separated food waste annually.[13]

6.1.6.1 Pre-Processing Operations

- To prepare collected wet waste for AD, a comprehensive pre-processing phase is essential. This phase may include the following steps:
- **Shredding:** Initial size reduction of waste materials.
- **Contaminant Inspection:** Manual inspection to identify and remove physical contaminants.
- **Recyclables and Residual Removal:** Manual or mechanical separation of non-organic materials.
- **Particle Size Reduction:** Further refinement to meet feedstock specifications.
- **Amendments:** Addition of water or low-solids organic wastewater to achieve a slurry with 12–14% solids content.
- **De-Packaging:** Removal of packaging materials for Industrial, Commercial, or Institutional (ICI) food waste, as needed.
- **Degritting:** Final removal of residual contaminants missed during earlier stages.

These processes ensure the feedstock meets the technical specifications required for efficient digestion and optimal system performance.

- **Capital Costs:** $5.5 million per 160,000 TPY facility.
- **Operating Costs:** $0.5 million annually per facility.
- **Land Requirements:** A minimum of three-acres per facility.

6.1.6.2 Anaerobic Digestion and Biogas Production

The refined slurry is fed into ADs, where it is processed to produce biogas and digestate (the residual byproduct). To meet the Authority's needs, three bioreactor facilities are recommended, each with an annual capacity of 160,000 tons of food waste. These facilities can feature a single large digester

[13] Generate Upcycle Canada

(approximately 5.5 million gallons) or multiple smaller digesters, with scalability to accommodate future growth.

- **Tipping Fees:** Estimated at $42 per ton, making food waste diversion more cost-effective than WTE or landfill disposal.
- **Capital Costs:** $43.8 million per 160,000 TPY facility.[14]
- **Operating Costs:** $4.1 million annually per facility.[15]
- **Revenue:** $6.7 million annually from tipping fees, with additional revenue potential from accepting industrial and commercial low-solids food waste for dilution or parameter stabilization.
- **Land Requirements:** A minimum of five-acres per facility; up to ten-acres may be needed if pre-processing infrastructure is included.

Each facility is expected to produce approximately 1,000[16] standard cubic feet per minute (scfm) of biogas, which can be upgraded to about 475,400 MMBtu/year of RNG for injection into natural gas pipelines.[17]

6.1.7 Biogas Upgrading and Pipeline Injection

Recent trends favor upgrading biogas to RNG, which can either fuel vehicles onsite or be injected into natural gas pipelines. This approach has the potential to generate approximately $1.7 million annually in RNG sales, assuming a market value of $3.50 per MMBtu.

6.1.7.1 Additional Revenue Opportunities

- **Environmental Attributes:** RNG generated from AD of MSW qualifies for D5 Renewable Identification Numbers (RINs) under the Renewable Fuel Standard, potentially generating an additional $9.6 million annually.[18]
- **Low Carbon Fuel Standards (LCFS):** RNG sold in markets like California or Oregon could yield additional revenue (California Air Resources Board, 2022).
- **Government Incentives:** Federal Investment Tax Credits (ITC) and other incentives may offset capital costs. [19]

[14] Based on data provided by NREL adjusted for TPY (Milbrandt, 2021).
[15] Based on data provided by NREL adjusted for TPY (Milbrandt, 2021).
[16] Assuming 3,300 scf/ton food waste based upon U.S. Environmental Protection Agency, Region 9 (East Bay Municipal Utility District, 2008).
[17] Assuming 1020 btu/scf, 97% upgrade efficiency and 91% facility uptime.
[18] Based upon D3 RIN price of $2.30/RIN, Assuming 114,000 BTU/GGE (Capozzola, 2024).
[19] For example, while the price of RINS can vary, current D3 RINS are valued at $2.85 (D3 Cellulosic RINs (OPIS) Futures Quotes - CME Group) Calculating $/RIN*RIN/0.077mmBTU=$37/RIN which would deliver an addition $23M/yr or $147/ton input.

6.1.7.2 Costs and Requirements

- **Upgrading and Injection Costs:** Estimated at $20.2 million for upgrading equipment and injection infrastructure (e.g., piping and compression) (California Air Resources Board, 2022).
- **Operating Costs:** Estimated at $1.9 million annually (California Air Resources Board, 2022).
- **Regulatory Requirements:** EPA approvals and commercial pipeline agreements are mandatory for RNG injection.

This comprehensive approach positions AD and biogas production as cornerstone technology for sustainable waste management and renewable energy generation.

Table 32 presents the capital expenses for AD and biogas facilities.

Table 32. Capital Expenses for AD & Biogas Facilities

	Capex	$/Ton
Capital Expenses		
Pre-Processing	$5,500,000	$3.24
Digester	$43,800,000	$25.86
RNG[a]	$20,200,000	$11.91
Capital Expense total	$ 64,000,000	$37.80
Operating Expenses		
Preprocessing and Digester	$ 7,000,000	$43.68
RNG	$ 3,500,000	$21.70
Operating Expense Total[c]	$ 7,400,000	$62.26
Capital and Operating Total	$ 71,400,000	$100.06
Revenue[b]		
Tipping Fees	$ 6,700,000	($42.00)
RNG Sales[b]	$ 1,700,000	($10.40)
Total Revenue	$8,400,000	($52.40)
Capital & Operating Costs – Rev[b]	$ 63,000,000	$47.66

[a] Includes clean up and injection. Injection costs represent approximately 25%. Clean-up costs may be reduced if utilized onsite as vehicle fuel.
[b] Additional revenue from the sale of attributes, LCFS or other offsets not included24.
[c] Costs for digestate management are included in the operational expense.

6.1.8 Digestate Management

Managing digestate, the byproduct of AD, is a critical consideration in facility design and operation.

- **Solid Digestate:** Separated solids can be composted, requiring additional site space, or converted into biochar through innovative treatment technologies.
- **Liquid Digestate:** Options include:
  - **Land Application:** Used as organic fertilizer within a 25-mile radius. Farmers often absorb the cost of transportation in exchange for the material.
  - **Wastewater Treatment:** Trucking the liquid digestate to nearby wastewater treatment facilities for further processing and discharge. This option incurs additional transportation costs depending on the distance to the WWTF.

By carefully integrating these considerations into facility planning and design, AD projects can achieve operational efficiency, financial viability, and compliance with environmental regulations.

6.1.9 Mixed Waste Processing Facility with Fiber Extraction

Mixed waste processing facilities separate valuable materials such as metals, paper, and plastics from organic or non-recyclable waste. Over time, these facilities have evolved significantly, driven by the need to enhance resource recovery, minimize landfill use, and comply with increasing regulatory requirements for waste diversion.

6.1.9.1 Historical Development

The concept of mixed waste processing facilities originated in the 1970s as a response to the growing need for resource recovery from increasing waste streams. Early facilities were limited by inefficient, labor-intensive separation methods. As recycling gained popularity, simple mechanical technologies were introduced, enabling modest recovery of materials like metals, but inefficiencies and high residual waste levels persisted.

Technological advancements over subsequent decades—such as disc screens, optical sorting, eddy current separators, and air classifiers transformed the industry. Automation enhanced both efficiency and safety. More recently, cutting-edge technologies like robotics, artificial intelligence (AI), and data analytics have further maximized resource recovery. Many facilities now incorporate AD or composting to recover organics, reflecting the industry's shift toward integrated waste management.

6.1.9.2 Modern MWP Processing Technologies

Today's advanced MWP facilities leverage a combination of mechanical, digital, and analytical technologies to enhance resource recovery:

- **Optical Sorting and AI-Powered Robotics:** Optical sorters, using visual and near-infrared (NIR) spectrum technologies, efficiently separate materials based on chemical composition. Integrating AI and machine learning enables rapid identification and sorting, significantly improving accuracy and throughput.

- **Advanced Mechanical Separation:** Facilities deploy trommel screens, air classifiers, ballistic separators, and eddy current separators to segregate materials by size, density, and magnetic properties.

- **Data Analytics and Smart Facility Management:** Sensors and Internet of Things (IoT) devices monitor equipment performance and waste flow in real time. Operators use this data to optimize processes, reduce maintenance, and address inefficiencies, enhancing productivity and reducing downtime.

- **Circular Economy Integration:** Many facilities now contribute to circular economy initiatives by producing secondary raw materials and collaborating with manufacturers to "close the loop" on material use. These efforts direct recovered materials into sustainable supply chains, reducing reliance on virgin resources.

6.1.10 Dry Mixed Waste Processing Facility

A wet-dry waste management system is a dual-stream collection system that separates waste at the source into wet waste (organic waste, food scraps) and dry waste (recyclables and non-organics). Dry MWPs are specialized plants that handle the dry fraction of the waste stream in a set-dry waste management system, accomplishing sorting, recovery, and diversion of recyclable materials before landfilling or energy recovery.

6.1.10.1 Historical Development

During the 1900's and early 2000's several Canadian cities implemented wet-dry systems in Ontario and Quebec. The communities of Guelph and Markham Ontario were early pioneers of the wet-dry approach utilizing concepts developed the firm R. Cave and Associates. The system concept aimed to divert organic waste from landfills while simplifying recycling and recycling participation. By the mid-2000's most wet-dry systems had moved away from the concept toward one with a Green Bin for source separated organics and a traditional Blue Bin for single stream recyclables.

The move was motivated by high contamination rates in the dry stream, insufficient sorting technology, and lack of marketplace acceptance for recovered materials. The experience did prove fruitful in that both communities have continued to evolve toward diversion rates that approach or exceed 80% and have built community behavior patterns that support continued high recovery rates.

Now, new advances in sorting technologies during the last few decades such as disc screens, optical sorting, eddy current separators, and air classifiers enable the industry to once again consider this more efficient collection approach. Automation has been able to enhance both efficiency and safety. More recently, cutting-edge technologies like robotics, advanced air sortation, AI, and data analytics have further maximized resource recovery. Finally, instead of composting, management of the wet stream can now more efficiently employ AD for the purpose of extracting clean renewable energy from the organic fraction.

6.1.11 Fiber Recovery as a Chemical Recycling Solution

Fiber recovery is an advanced chemical recycling method focused on extracting high-value fibers from materials that are traditionally difficult to recycle, such as food-contaminated paper and plastic-coated packaging. This process provides a sustainable alternative for managing materials that would otherwise be sent to landfills or incinerators due to contamination.

A key aspect of the fiber recovery facility approach is its integration with an upstream MSW processing system. This system uses mechanical sorting technologies to remove non-fiber-based materials (e.g., plastics, metals, glass) and contaminants. Additionally, the process incorporates a downstream AD component for further material diversion and energy recovery.

6.1.11.1 Fiber Recovery Process Overview

After mechanical sorting, the residual waste is directed to the fiber recovery stage, where materials are pulped using water and mechanical action to separate the fibers. Key steps in the process include:

- **Specialized Pulping:** Designed to handle food-soiled and plastic-coated materials, enabling efficient fiber recovery.
- **Separation and Refinement:** Processes such as autoclaving for sanitation and contaminant separation, additional contaminant removal, and fiber refinement ensure the purity and quality of the recovered fibers.
- **Fiber Collection:** The refined fibers are dewatered, dried, and prepared as raw material for producing new paper and packaging products, closing the recycling loop and reducing the need for virgin fibers.
- **Residual Waste Utilization:** Remaining waste is processed through AD, providing energy recovery to offset the energy demands of the recycling process.

6.1.11.2 Facility Design and Requirements

To manage the post-recycling MSW flow of approximately 1,000,000 TPY as considered in Scenario E, the Authority will require a facility with the following specifications:

- **Facility Quantity and Capacity:** Three MWP Facilities with fiber extraction with 330,000 TPY each.
- **Facility Size:** A 240,000-square-foot building on a 30- to 40 acre site.
- **Operational Features:** The facility will include areas for waste delivery, tipping floors for waste management, and three core operational functions:
    1. **Sorting:** To separate non-fiber-based commodities and contaminants.
    2. **Fiber Extraction:** To recover and refine fibers from contaminated materials.
    3. **Anaerobic Digestion:** To process residual waste for energy recovery.
- **Product Logistics:** Dedicated infrastructure for shipping recovered fibers and energy products, ensuring the facility achieves its recovery and diversion goals.

6.1.11.3 Cost Analysis Assumptions

The following assumptions were made in preparing the cost analysis:

- The facility must handle the full MSW flow after initial recycling.
- Integration of advanced sorting, fiber recovery, and AD technologies is required.
- The site and infrastructure must accommodate efficient operations, product handling, and compliance with environmental and regulatory standards.

By implementing this integrated approach, the fiber recovery facility can significantly enhance recycling rates, reduce landfill dependency, and contribute to the circular economy through the production of sustainable raw materials.

The timeline required from permitting, site development, procurement, education, to operation is expected to take approximately two years. Siting, preliminary design, and Authority approval will likely take an additional two to three years, depending on the Authority's budgeting, permitting, and approval process.

6.1.11.4 Challenges and Opportunities

While advancements in MWP processing are significant, challenges remain:

- **Material Contamination:** Contaminants in mixed waste streams degrade the quality of recovered materials, complicating recycling efforts. Further development of advanced sorting and decontamination techniques is essential.
- **Policy and Regulation:** Stringent regulatory requirements for recycling and emissions reductions are increasing both capital and operational costs, requiring facilities to innovate and adapt.
- **Technological Innovation:** Continued progress in robotics, AI, and other advanced technologies will drive further improvements in sorting efficiency, accuracy, and adaptability, making facilities more resilient to evolving waste streams.

Table 33 presents the estimated cost for one MWP Facility with fiber extraction and an AD Facility.

Table 33. MWP with Fiber Extraction and AD Facility Estimated Cost

MWP Facility [20]	Estimated Cost	Description
Total Throughput	330,000 TPY	MSW Tons Excluding SSR Material
Capital Cost (Per Site) * Excludes: Cost of Land	$363,000,000	Estimated Cost
Annual Facility Cost ** Excludes: Cost of Land	$64,000,000	OpEx Plus Annualized CapEx
Estimated Revenues	$(23,000,000)	Estimated Generated Revenues
Average Cost Per Ton	$124	Includes Net Operating Cost and Annualized Capital Costs Spread Over Incoming Tons

6.1.12 Drop-Off Centers

It is recommended that at least one Drop-Off Center be established per ILA Member City, for a total of up-to 30-sites. However, given the limited space available and cost of land, at a minimum, one Drop-Off Center should be established per 150,000 Authority residents, with a minimum of 13-sites. Given the existing five drop-off center facilities currently located in Broward County, the Authority would need eight additional drop-off centers. Each Center should be sited in an area that is most convenient to potential users, whether that means it is centrally located, along a commonly traveled highway, or near popular areas of interest (e.g., parks, shopping malls, and recreation areas).

Table 34 presents the materials that would be collected at the Drop-Off Centers and the anticipated end market.

Table 34. Drop-Off Center Anticipated Materials

Material	End Market/Contractor
HHW	Contracted Vendor
Electronic waste, Batteries	Contracted Vendor
Textiles	Local Non-Profit/Charity
Glass bottles and containers	Glass Beneficiation Site
SSR	SS RMPF
Yard Waste	Contracted Vendor
Tires	Contracted Vendor, Tires Recycler
Scrap Metal	Contracted Vendor, Scrap Metal Recycler

[20] RRS, 2024, various equipment and building vendor quotations.

Each site should allocate approximately 0.25 to 0.5 acres of operational space for material handling and storage. Materials will be collected using various container types, including roll-off containers, Gaylord boxes (large, corrugated cardboard boxes designed for bulky or irregularly shaped items), and metal donation bins. To support efficient operations, each site will be equipped with two shipping containers designated for the storage of HHW, paint, and electronic waste. Additional site requirements include one electric pallet jack, Closed Circuit Television (CCTV) cameras for monitoring and deterring illegal dumping, and four roll-off containers. Anticipated costs for these facilities include land development and site preparation expenses.

6.1.12.1 Operational Staffing and Contracts

The management of HHW, electronic waste, and batteries will be overseen by a qualified chemist and trained technicians, while laborers will handle other material streams. It is assumed that chemists and technicians will be contracted through a third-party vendor. An RFP for a 10-year HHW and Electronics Recycling Contract should incorporate costs for necessary equipment and facilities, including sheds, drums, and shipping containers. Laborers may either be contracted or hired as Authority staff.

To ensure effective oversight and operational efficiency, it is recommended that the Authority hire up to two internal managers to handle administrative responsibilities, data management, and maintenance tasks.

6.1.12.2 Tire Recycling Performance and Recommendations

Florida counties have demonstrated varying levels of success in recycling tires. While many have achieved high recycling rates, the FDEP reported that Broward County recycled only 3% of the 24,483 tons of tires generated in the County. In comparison, neighboring Palm Beach County achieved a 65% recycling rate, Miami-Dade County achieved 53%, and Collier and Hendry Counties reported rates of 66% and 55%, respectively (Florida DEP, 2024b).

Drop-Off Centers are practical solutions for collecting small quantities of tires from residents. Typically, contractors provide a roll-off container or trailer at each center, which on-site staff fill with tires over time. Proper training in tire stacking, or “lacing,” is critical to maximize the trailer’s capacity and ensure operational efficiency.

6.1.12.3 Yard Waste, Glass, and Other Materials

Materials such as yard waste and glass bottles and containers will be collected in roll-off containers. These materials will then be transported to appropriate end markets or interim processing facilities for further handling or recycling. **Table 35** presents the estimated cost for each Drop-Off Center.

Table 35. Drop-Off Centers Estimated Costs

Drop-Off Centers	Estimated Cost	Description
Capital Cost (Per Site)*	$140,000	Includes: roll-off containers, eight-yard dumpsters, site development (site leveling, grading, paving, fencing, cantilever gates, lighting fixture, striping, CCTV cameras for illegal dumping, etc.)
Operating Cost (Per Site)	$1.03M	Includes: 3x/week, eight-yard dumpster service for SS; roll-off service for yard waste, glass, tires, and scrap metal; labor, contracted processing costs for HHW and e-waste, processing/tip fees and HHW facility/equipment costs spread over 10-yr period through contract; porta potty rentals for center staff
Total Cost (Per Site)	**$1.17M**	

* Capital cost excludes the cost of land.

The projected timeline for completing permitting, site development, procurement, public education, and initiating operations is approximately 18 months. However, the siting process, preliminary design, and securing Authority approval may extend this timeframe by an additional one to two years, contingent on the Authority's budgeting, permitting, and approval procedures.

The design of the Drop-Off Centers should prioritize adaptability to accommodate shifting market demands and the emergence of new material streams. This flexibility can be achieved, in part, by selecting sites with more space than is initially required. Furthermore, strategies for mitigating illegal dumping should be incorporated into the planning and operational framework.

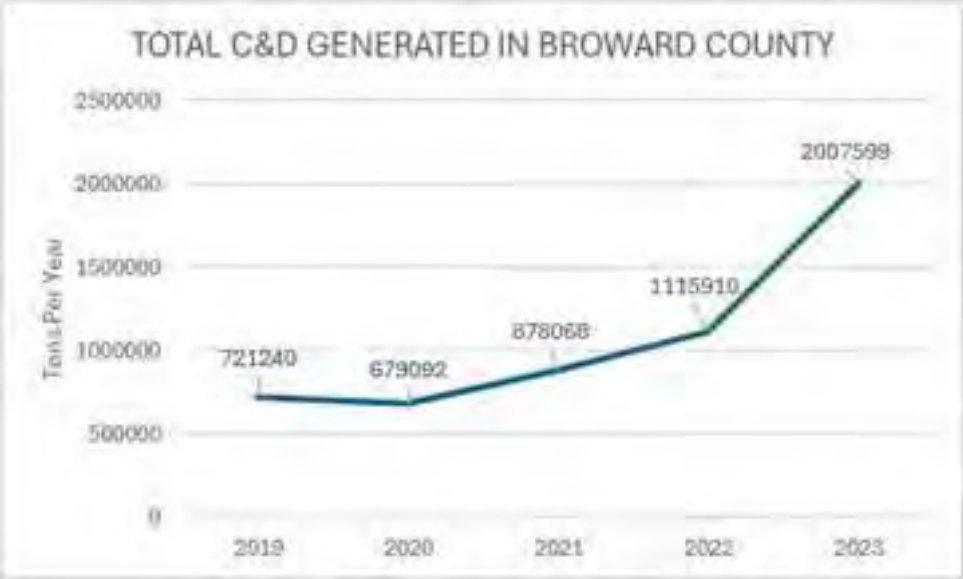
6.1.13 C&D Recycling Facility

According to the FDEP, Florida has a MSW recycling goal that includes C&D, which accounts for nearly 25% of the state's total MSW stream. FDEP reported that over 19 million tons of C&D debris were generated statewide in 2023, with Broward County contributing more than 10% of this total, approximately 2 million tons. While about 800,000 tons of C&D debris were recycled within the County, an estimated 1.5 million tons remained in the waste stream and were sent to landfills (Florida DEP, 2024).

As reflected in **Table 36**, between 2019 and 2023, Broward County experienced a significant 178% increase in C&D debris generation. This growth is attributed to several factors, including net in-migration driving increased construction, demolition, and remodeling activities, as well as the escalating impact of natural disasters, which has become the most significant contributing factor. The generation of C&D and its consequent waste characterization is complex.[21]

[21] Florida is fortunate to have resident scholars on C&D's nature and composition, and much more information can be deciphered through some of their outstanding work, i.e., Townsend, PhD., T, University of Florida, Anshassi, M, PhD., FL Polytechnical University, "Waste Management Principles and Practices:", Construction and Demolition Debris", Springer Nature Press, Switzerland, 2023.

Table 36. Total C&D Generated in Broward County



For planning purposes, C&D can generally be classified into a few general categories, as described below.

6.1.13.1 Heavy Demolition Debris

Separated, heavy demolition debris includes clean concrete, asphalt, and uncontaminated rubble (e.g., dirt, rock, sand). This material typically has well-established, localized direct recovery channels for each type of material and is generated from roads, bridges, concrete building exteriors, sidewalks, and other structures. Concrete, aggregate, and asphalt processors crush, size, and return these materials to construction projects for use in concrete production, asphalt mixes, inert materials such as sized rocks, stones, and concrete for road bases, foundations, riprap, drainage, reclamation, and other applications. Due to its relatively homogenous and inert nature, heavy demolition debris is cost-efficient to recycle and requires minimal processing. Removal transportation is provided by tilt-body (side or rear tilt), heavy duty trailers. Recovery may increase through regulation, so more is captured, especially by permit enforcement of construction site sorting requirements before material is mixed.

Heavy demolition debris, which is less likely to be processable, originates from two primary sources:

- **Heavy Mixed Debris.** This material is generated during the removal, replacement, or improvement of buildings, often involving large-scale demolition using heavy equipment. While some limited recovery and recycling of materials such as metals (e.g., electrical cables, fasteners, and structural steel), clean unreinforced concrete, road asphalt, and wood takes place on-site, most of the debris consists of highly heterogeneous materials. These include a large proportion of heavy, crushed building materials, along with a smaller fraction of lighter materials such as wood, plastic, asbestos, roofing panels, insulation, drywall, paneling, flooring, and lighting. The materials are sized, crushed, and mixed, resulting in a high volume of fines (particles under 4 inches). Additionally, universal waste is often mixed into the debris. The mixing and cross-contamination, along

with the significant quantity of fines, make this segment particularly challenging to recycle. Much like separated debris, a large portion of this material requires specialized transport, such as tilt-trailers.

Heavy demolition debris also accumulates during storm flows caused by tropical weather events, where mixed debris must be quickly removed from damaged or destroyed structures. These materials often contain high moisture content, which accelerates spoilage, further mixing constituents, and increasing odor. As a result, much of this debris is ultimately directed to landfills because it becomes too damaged for processing. A common example is wet drywall and plaster materials.

- **Light C&D.** After excluding the heavy debris, the remaining mixed C&D are generated during new construction, remodeling, and the replacement of building components (such as roofs and patios). According to the most recent data from the USEPA, the national C&D waste stream generates approximately 600 million tons annually, more than twice the amount of MSW. Heavy debris constitutes the majority of C&D generation, while construction-related debris represents less than 10% of the total (USEPA, 2018).

6.1.13.2 Mixed C&D Processing Opportunity

Mixed C&D materials are typically collected through conventional disposal methods, such as roll-off containers, open dump trucks, and self-haul vehicles (e.g., stake body trucks).

Processing mixed C&D debris presents a significant opportunity to reduce disposal costs associated with light mixed C&D materials by separating traditional recyclables and bulk divertible materials for non-landfill applications. The key benefits of sorting mixed C&D debris include:

1. **Preserving Landfill Space** – Diverting materials from disposal helps preserve valuable landfill space.

2. **Reducing Disposal Costs** – Recovering divertible materials and recyclables can offset processing fees, reducing overall disposal costs.

3. **Beneficial Reuse** – Recovered materials can be used at landfill operations for purposes such as ADC, road construction, or slope stabilization.

4. **Green Building Certification Compliance** – Recovery efforts can help achieve compliance with green building certification requirements.

At mixed C&D MRFs, recovery rates vary based on the composition of incoming materials. Typically, facilities target the following recovery rates:

- **20–40% recovery of traditional recyclables and other divertible materials,** with actual recovery rates averaging between 15–30%. These materials include metals, plastics, and paper that are clean enough for resale. Bulk divertible materials, such as clean wood, inert materials (e.g., rock, brick, dirt, ceramics), and clean concrete, generally have lower market value, but their diversion significantly reduces disposal costs.

- **30–50% recovery of fines (Recovered Screened Materials, or RSM),** which are mixed fines smaller than three inches in size. RSM can boost recovery rates (sometimes exceeding 60%) when used as ADC in landfills. This application also offers GHG benefits

by reducing the need to import soil for landfill cover. However, if RSM cannot be used as ADC, it is typically landfilled.

- **25–45% landfill disposal** of remaining materials.

While shingles and gypsum/drywall materials can be easily separated, they are often not recovered at C&D recycling facilities in the Southeast U.S. due to the additional processing required, including odor and asbestos management, as well as the ephemeral nature of the markets for these materials. These challenges make recovery economically unfeasible outside of regions with high landfill tipping fees. To improve recovery rates in South Florida, active market development and regulatory solutions, such as procurement preferences, will be essential. Further study is needed, or these materials will continue to be landfilled.

6.1.13.3 C&D Processing Facility Characteristics

Mixed C&D Processing Facilities are designed with inherent flexibility, enabling adjustments to sorting processes based on material composition, transportation costs, and local market conditions. For instance, the ability to recover RSM because they will need to be disposed, or more fines for landfill cover, replacing the need to import dirt and other materials, is a matter of how material is sized and crushed after arrival on the site, and adjustable residence time exposed to screening.

Existing C&D processing facilities may have adequate capacity to manage the current tonnage of C&D under current market conditions. However, with increasing tonnage and the potential for new policies and the evolution of markets that improve the recovery and marketability of materials, additional facilities will likely be needed.

To manage these new inbound tons, the Authority should consider the future development (whether publicly or through a P3) of up to two strategically located facilities that add processing capacity to the region. The facilities should each have a throughput capacity of 450,000 TPY or 100 TPH to manage the 850,000 tons needing processing.

The largest capital component is the building and site improvements to accommodate the efficient movement and storage of materials at all phases of processing. Siting a C&D processing facility at or very close to a landfill presents the ideal scenario to allow for the expeditious disposal of non-marketable fractions as well as the mutual use of facility scales and some rolling stock.

The scenario presented herein, including the estimated facility costs reflected in **Table 37**, assumes co-location of a mixed C&D processing facility at a landfill or transfer station site.

Table 37. C&D Processing Facility Costs

Estimated C&D Processing Facility Costs					
Fixed Depreciation Costs	**CapEx**	**Annual St. Line Depr. (Years)**	**Annual Cost**	**$/Ton 100% Capacity**	**$/Ton 80% Capacity**
Building and Site	$31,000,000	25	$1,240,000	$2.76	$3.44
Equipment	$8,000,000	10	$800,000	$1.78	$2.22
Heavy Equipment	$2,000,000	5	$400,000	$0.89	$1.11
TOTAL FIXED				**$5.42**	**$6.78**
OpEx			**$6,400,000**	**$14.22**	**$17.78**
	TONS	**T&D to LF** (Okeechobee)			
Disposal (50% of Inbound Material)	225,000	$48	$10,800,000	**$24.00**	**$30.00**
Fines Management- (Assumes $0 Disposal for Alternative Daily Cover)	**TONS- 30 % Fines**	**Trans- $300/22.5 T load**			
Transportation to Market	135,000	$ 13.33	$ 1,800,000	**$ 4.00**	**$5.00**
TOTAL COST PER TON				**$47.64**	**$59.56**

Curbside collection of construction debris is generally not provided, as it is not needed on a regular basis. Additionally, roll-off containers and specialized trucks do not handle curbside pickups, meaning there is no per-household fee associated with this service.

Different sites and locations will require varying levels of preparation, permitting, and other project development phases, all of which will influence the timeline. The development process outlined here represents a typical sequence of project milestones, without knowledge of the specific status of the selected site's siting process, procurement and budget approval requirements, or necessary permitting. It is also important to acknowledge that both the Authority and any vendors involved will be subject to time constraints, influenced by decision-making timelines, budget cycles, and the need for specialized equipment.

Co-locating a C&D processing facility with a landfill and a yard waste/organics complex could streamline the development process. Additionally, integrating the facility with a yard waste processing site would result in multiple efficiencies, including shared scales, management capabilities, processing of clean wood, and savings in transportation and disposal logistics.

Table 38 presents a conceptual development timeline for a C&D facility.

Table 38. C&D Processing Facility General Development Timeline

QUARTER	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16
Siting	•	•														
Preliminary Design	•	•	•													
Authority Approval			•	•												
Operating Partner Procurement Process				•	•	•										
Final Building & Site Design						•	•	•								
Permitting								•	•							
Site Development (Utilities, Water, Parking, Fencing, Roads, Pads, etc.)									•	•	•	•	•			
Building Construction										•	•	•	•			
Building Inspections Sign-off												•	•	•		
Process Equipment Selection & Procurement								•	•	•	•	•	•	•	•	
Sequential Hiring Training Staff													•	•	•	•
Equipment Installation														•	•	
Equipment Startup & Training[22]															•	
Throughput & Efficiency Testing																•
Operation																•

6.1.14 Transfer Stations

Transfer stations are solid waste facilities that allow for an efficient and economical means to transfer waste from a centralized collection point (transfer station) to the final disposal facility. At a transfer station, MSW from local collection vehicles is unloaded, then reloaded into larger tractor trailers for delivery to appropriate disposal facilities. Transfer stations can reduce the collection cost of hauling waste, by allowing for shorter trips and consolidation of waste before delivery to the final disposal facility, and they have the added benefit of reducing overall collection truck traffic on public roadways.

As noted in the Task 2 White Paper, Waste Management owns and operates the Davie Transfer Station, which is located at 2380 College Avenue, Davie, FL 33317. This transfer station receives approximately 1,000 TPD of Class I MSW. Considering the amount of MSW that will need to be

[22] Florida DEP, 2024.

managed by the Authority, the SCS Team is considering multiple transfer stations that are strategically located throughout Broward County (i.e., north, central, south).

6.1.14.1 Transfer Station Facility Design and Requirements

The following elements are critical when evaluating the design of a transfer station:

- Design Capacity
- Operating Days/Hours
- Storage Requirements/Constraints
- Land Area
- Tunnel/Loading Configuration
- Peak Loading Conditions
- Number of Unloading Positions
- Building Size
- Tipping Floor Storage Size
- Queuing Distances
- Scale/Scalehouse
- Stormwater Management
- Utilities
- Site Layout
- Tipping Floor
- Leachate Management
- Environmental Controls (e.g., Odor, Dust, Noise)

In addition, consideration should be given to the ultimate location of a transfer station. In the case of the Authority, it would be ideal for the transfer station to be sited within 10-miles of I-75 and within 20-miles of the population centers. It is highly desirable to achieve harmony with surrounding area by seeking an area that has appropriate zoning and is compatible with its surrounding area.

Based on the design assumptions, approximately 15-acres would be secured for each transfer station that would range in capacity between approximately 1,700 TPD and 4,000 TPD. Ample area is specified for each transfer station site to account for truck scales, queuing, on-site circulation and other facility features, including a biofilter, trailer storage area, security features, and associated site improvements. To maximize throughput, it is assumed that each transfer station would use a full-depth tunnel configuration. It is further assumed that each building would be an uninsulated structure with a steel frame with steel roof and wall panels, with translucent panels installed in the walls and roof to provide some natural lighting. On the upper level, the eave height would be a minimum of 35-feet. Within the transfer station, the floor-to-floor difference in elevation would be approximately 15-feet from the tipping floor elevation to the transfer tunnel floor elevation.

In terms of ancillary spaces, it is assumed that transfer trailer storage space would be required. An odor control system would be contained within a biofilter building, or a portable, modular system could be used. The transfer station could also use a misting, vapor, or other air filtration system to control odors. These systems would not require a separate building and could be included in the station building. Three key objectives are summarized below:

- **Operational safety** results from applying a set of planning parameters employed in developing the site and the transfer station. Safety would be achieved through security

fencing around the perimeter of the site; separation of collection vehicles from transfer trailers; commonly used roadway design principles; and signage.

- **User-friendly features** provide for ease of use of the facilities. They would include directional signage; wide roadways to allow for easy collection vehicle circulation throughout the site; enclosed vehicle maneuvering areas; unobstructed enclosed unloading areas (tipping floor); and associated facilities.

- **Cost-effective design** approaches should lead to economical facility construction through efficient and functional use of the site areas to minimize the extent of the area required to be developed; use of standard construction materials for the site work and transfer station structure; and incorporating into the design the use of conventional building systems (e.g., a pre-engineered metal building for the transfer station, a modular structure for the scale house). Any transfer station would be required to adhere to Broward County building standards.

While the actual locations for the proposed transfer stations will be further explored in future white papers, the design for each transfer station would address the following elements at a minimum:

6.1.14.2 Transfer Station Facility Siting

Siting considerations would include a review of local and state site restrictions, applying exclusionary (e.g., wetlands and floodplains, endangered and protected flora and fauna habitats, protected sites of historical, archeological, or cultural significance) and technical siting criteria (e.g., proximity, access to major transportation routes, site area, circulation, buffers, topography, access to utilities, ability to expand, additional site uses, zoning concurrency), and environmental justice.

6.1.14.3 Transfer Station Cost Considerations

When developing transfer station cost estimates, regardless of the procurement approach, there are certain costs elements that must be considered. These items include:

- Site acquisition
- Construction
- Vehicle and Equipment
- Staffing
- Operations and Maintenance (e.g., Professional Services, Repairs, Fuel, Utilities, Supplies, Minor Capital Outlays, Insurance, Fees)

Table 39 presents the cost estimate by scenario, excluding vehicles and equipment.

Table 39. Transfer Station Cost Estimates by Scenario

	Scenario				
	A	B	C	D	E
Facilities	3	3	3	3	3
Total Area/Facility (Acres)	13	10	10	15	12
Annual Tons/Facility	890,000	546,000	443,000	1,040,000	703,000
CapEx/Facility	$46.6M	$28M	$24.5M	$52M	$32.7M
Annual OpEx/Facility	$31M	$19M	$17M	$35M	$25M
Annual Revenue/Facility[a]	$160.1M	$98.3	$79.8	$187.1	$126.6
Cost (Per Ton)	$87	$86	$94	$84	$82
Net Dollars (Per Ton)	$27	$26	$34	$24	$22

[a] Assumes a tipping fee of $60/ton.

It should be noted that the financial analysis is budgetary at this stage, as a detailed scope and site-specific parameters have not yet been identified but will be as the master planning process progresses.

6.1.15 Waste-to-Energy

The first solid waste incinerators, which were the predecessors to modern WTE facilities, were initially developed in New York in 1885 to process the high volume of waste being generated at that time. According to the Energy Information Administration, the first WTE facility in the U.S. (a facility that produced electricity from the combustion of solid waste) went online in New York in 1898. However, WTE technology was not widely used until the 1970's. Instead, the use of rudimentary incineration facilities grew during the early decades of the 20th century until the 1930s, when there were more than 700 units in operation. In the early 1960s, the US Public Health Service (USPHS) solid waste program began to study problems with incineration as a means of disposal. At that time, many major US cities depended on those antiquated, poorly designed, and operated incineration facilities to manage a major portion of their waste disposal tonnage.

With the assistance of USPHS, the industry began to develop new concepts in design, materials, and operation. New designs included the installation of scales to help monitor and control the waste feed throughput of the facility, and larger tipping floors and pits designed to handle the volume of the facilities. Hoppers were designed to allow gravity flow of MSW into furnaces and to provide a seal at the charging end of the unit. Bridge cranes became the main means for charging furnace hoppers. Terminology became more standard with design terms. Several advancements in air pollution control technology and improved combustion practices continued.

In 1970, the Resource Recovery Act (RRA) amended the federal solid waste legislation and developed a broader solid waste role for the federal government. RRA defined resource recovery as the recovery of both materials and energy recovery from MSW. This led to the widespread use of WTE technology and the development and improvement of the modern WTE facility concept. Many old incinerators were shut down due to pressures of the Clean Air Act as well as the emergence of sanitary landfills. The RRA gave federal solid waste program opportunities to address WTE with

financial and staffing resources and to expand the efforts that began during the 1960's to enhance and increase the efficiencies of WTE facilities. Throughout the 1970's and 1980's federal solid waste programs studied many new MSW combustion concepts, specifically, ones that would allow for the recovery of both materials and energy.[23] Since that time, many 'modern' WTE facilities were constructed in the United States and WTE is considered a commercially proven and effective thermal conversion technology, with more than 60 facilities currently in operation today.

In July 2015, the Solid Waste Authority of Palm Beach County achieved commercial operations of the 3,000 TPD Palm Beach Renewable Energy Facility No. 2, which was the most recent new WTE facility constructed in the United States and several new or expansion projects are currently in the planning and implementation stages throughout North America as existing infrastructure reaches the end of its useful life and capacity needs grow.

6.1.15.1 Existing Waste-to-Energy Infrastructure in Broward County

The South Broward WTE Facility, also known as the South Broward RRF, is located at 4400 South State Road 7, Fort Lauderdale, FL 33314. The facility is currently privately owned and operated by WIN Waste. The facility is a mass burn WTE facility that was constructed in 1991 and consists of three Municipal Waste Combustor (MWC) units with auxiliary burners, lime storage and processing facilities, ash storage and processing facilities, a cooling tower and ancillary support equipment. The facility operates 24-hours a day, every day of the year and only accepts processible residential, commercial, and nonhazardous waste. The facility's MWC's each have a nominal design capacity of 750 TPD, and a total throughput capacity is limited to a maximum of 2,589 TPD. The nominal (i.e., generator nameplate) electric generating capacity of the facility is 66.1 megawatts (MW), which the net electricity after in-house electrical usage is sold to the local utility company. The South Broward RRF receives and processes a large portion of the Authority's waste stream. The resulting ash residue from the facility is disposed in an onsite Class I ash monofill owned by Broward County. Note that WIN Waste is currently contemplating the sale of the South Broward RRF.

6.1.15.2 WTE Process Description

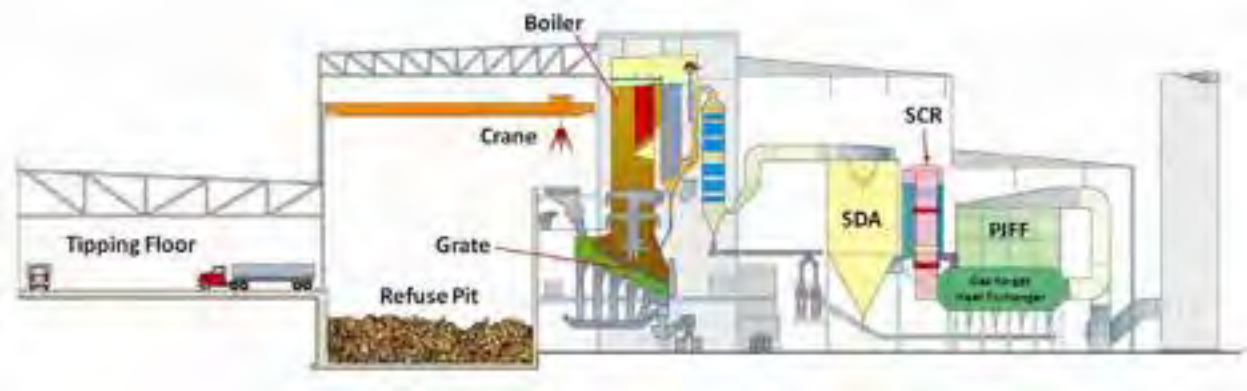
Mass-burn/waterwall combustion is one of the most common commercially viable technologies for conversion of MSW to energy. The South Broward RRF currently uses the mass burn/waterwall WTE technology and as such mass-burn/waterwall combustion would also be the technology recommended should the Authority move forward with development of a new WTE facility.

With the mass-burn/waterwall combustion technology, refuse does not require pre-processing before it can be combusted. However, waste screening still occurs, including separation of oversized materials and removal of hazardous or potentially explosive materials. Refuse is stored in a pit and moved via an overhead crane into a feedchute and then typically a hydraulic ram pushes the waste onto a reciprocating or roller grate. The grate moves the refuse through a combustion furnace on the grate until combustion is complete. Combustion air in excess of stoichiometric amounts is supplied both below and above the grate. Water-filled tubes in the furnace walls are used to recover heat to produce steam and/or electricity. Generally, mass burn units range from 50 to 1,250 TPD, and multiple units can be installed at a single facility. Residual ash, usually about 10% of the initial volume (25% of the weight) of the incoming MSW, remains after the combustibles in the waste are burned. In addition, this process produces flue gas, which includes pollutants that must be strictly

23 https://www.mswmanagement.com/collection/article/13001185/a-brief-history-of-solid-waste-management-during-the-last-50-years-part-9a

treated via air pollution control devices.[24] An example side profile of a mass-burn WTE facility is shown in **Figure 4** below.

Figure 4. Example Profile Configuration of a Mass-Burn WTE Facility in the U.S.



6.1.15.3 Schedule Considerations

The development of a WTE facility typically takes seven to ten years to complete. This time frame, which includes the preliminary planning stage, siting, permitting, financing, procurement, design, and construction, varies depending upon the complexity of the project and extent of the regulatory and public concerns. The site ultimately selected for any development of a WTE facility will have its own unique schedule impact considerations, which could extend or compress the schedule duration. A summary of schedule considerations associated with the implementation and development of a WTE facility is below.

6.1.15.4 Siting/Planning

Several activities are identified for the siting of a new WTE facility that are required to support the regulatory, permitting, design, and construction phases. Siting/Planning includes the following activities:

- Siting selection and land acquisition, if applicable
- Public outreach activities

6.1.15.5 Financing

Construction of a large capital project, such as a WTE facility, is most often financed, as most entities do not have the available funds to pay for the capital costs when constructed. A number of financing options exist for funding large capital projects, with the most common being municipal bond financing. It is anticipated that the Authority would most likely use a form of long-term revenue bond financing. Bond financing terms can vary and are determined during agreement development.

First, a financial plan for bond issuance would be developed to determine the bond issuance method and schedule. This would include bond issuance support and a cash flow analysis at the

24 https://www3.epa.gov/ttnchie1/ap42/ch02/final/c02s01.pdf

commencement of the project and possibly a phased financing strategy, with interim and final financing. The interim financing could correspond with initial planning, permitting and procurement activities required prior to contractor notice to proceed. The final financing would likely correspond with the contractor notice to proceed and/or receipt of all regulatory approvals for construction.

Note that the financing tasks are not consecutive, and do not occur directly one after the other. The typical total duration for financing tasks, commencing with the bond issuance(s) and cash flow analysis and ending with the final financing, is estimated to be between four and six years. The financing tasks typically take place concurrently with the permitting and procurement tasks.

6.1.15.6 Regulatory/Permitting

The preliminary schedule reflects the permitting process including application preparation, submission, clarification, and issuance of permits and approvals required for the construction and start-up of a new WTE facility. The critical path typically includes preparation of required permits (i.e., dredge and fill permit, air permit, Public Service Commission (PSC), and Power Plant Siting Act (PPSA) permitting/approval processes). These and other permits can be developed concurrently in order to reduce the permitting duration; however, permitting would still be anticipated to range from approximately 3.5 to 4.5 years from preliminary application development through issuance of all required permits.

There are many variables associated with the permitting process that could affect the duration of the permitting effort. The ultimate permitting duration will depend on RFIs, potential public opposition or protest, or change in law.

6.1.15.7 Procurement

The procurement process associated with the development of a new WTE facility typically includes the following:

- Design criteria development
- Procurement strategy development
- RFI development, response, and response evaluation
- RFQ development, response, and response evaluation
- RFP development, response, and response evaluation
- Legal activities associated with development of the draft and final Construction and Operating Agreements

The design criteria development is required as part of the RFQ/RFP procurement process and is estimated to take approximately 6 months to one-year. The RFQ/RFP procurement process is estimated to take approximately two to three years and would occur concurrently with the permitting and financing activities.

6.1.15.8 Design and Construction

As any project moves forward, detailed construction schedules are developed as part of the planning and procurement process. Typical construction-related activities include the following and the associated schedule is presented in **Table 40**:

- Preliminary construction activities, such as initial site work and preparation
- Detailed design
- Preliminary site and utilities work
- Procurement of major equipment
- Procurement of long lead time items
- Construction
- Start-up and commissioning
- Acceptance testing
- Final inspection and contract close-out

Table 40. WTE Facility Implementation and Construction Timeline

Total Project Duration	7 –10 years
Estimated Commercial Operation	2033 - 2035
Siting/Planning	**1.5 years**
Siting Analysis and Land Acquisition	N/A
Financing	**1.5 years**
Permitting	**3.5 years**
Army Corps of Engineers Dredge and Fill Permit	1 year
Environmental Resource Permit	1 year
PSD Air Construction Permit	2 years
PPSA Process Activities	2.5 years
Procurement	**2 - 3 years**
Design Criteria Development	6 months – 1 year
RFQ / RFP Process	1.5 - 2 years
Design and Construction	**4 years**
Design	3 years
Procurement of Major Equipment	3 years
Preliminary Site and Utilities Work	9 months
Construction	2.5 years
Start-up and Commissioning	6 months
Acceptance Testing to Commercial Operations	2 months
Final Inspection and Contract Closeout	6 months

6.1.15.9 Estimated Costs for Development of a WTE Facility

Siting evaluation criteria and associated site conditions will impact the overall cost for the development and operation of a new WTE facility. The following summarizes impacts to the capital and operational costs.

Capital Costs

The following may affect the capital costs for development of a new WTE facility.

- Local market labor and equipment and material costs
- WTE facility design (i.e., water cooled vs. air-cooled condenser, carbon capture equipment, etc.).
- Off-site road development when an access road to the site is not yet available
- Off-site utilities construction for interconnection to the nearest pipeline typically include:
  - Ductile iron pipeline for potable water
  - Potable water booster pump station
  - PVC force main for wastewater
  - Natural gas pipeline for use as auxiliary fuel for start-up, shutdown, and emissions control
  - Electrical transmission mains
  - An industrial water supply well, where permittable, or rehabilitation of existing wells
  - Additional right of ways or easements required for off-site utilities or access
- Additional stormwater requirements for high groundwater levels or floodplain mitigation
- Additional stormwater requirements for temporary retainage during construction
- Geotechnical site preparation work including:
  - Lake fill costs (if necessary)
  - Removal of unsuitable soils
  - Replacement with select fill
  - Additional geotechnical requirements, such as vibrocompaction of fill or other structural requirements
- Floodplain mitigation by elevating structures.

- Wildlife mitigation for Protected, Threatened or Endangered species
- Permanent wetland mitigation
- Additional zoning and permitting cost possibly required for greenfield sites
- Additional permitting cost associated with difficulty due to site location or constraints

Cost Considerations Summary

Table 41 presents the preliminary capital cost and annual operations and maintenance cost estimates. Note that the capital cost excludes land acquisition as well as any site-specific considerations

Table 41. Estimated Capital and Operational Costs for 1M tpy (3,000 TPD) WTE Facility.

	Estimated Cost (2025 Dollars)	Estimated Cost (2045 Dollars)
WTE Facility		
Capital	$990,000,000	$1,800,000,000
Annual Net O&M	$14,200,000	$36,900,000
Estimated Operational Data		
Annual Ash Disposed (Tons)	283,000 (No AMR)	76,000 (With AMR)
Annual Ferrous Recovered (Tons)	23,000 (No AMR)	42,000 (With AMR)
Annual Non-Ferrous Recovered (Tons)	1,400 (No AMR)	4,200 (With AMR)
Gross Energy Generated (MWh)	675,000	

Costs assume an annual escalation rate of 3%. Net O&M costs do not include ash hauling.

6.1.16 Landfills

Landfills are a necessary component to managing MSW that is not beneficially used. While this White Paper presents scenarios to maximize the beneficial use of waste stream components, the fact remains that a landfill remains an essential component of an integrated solid waste management system. In addition, there are regulatory requirements that must be considered. Specifically, Fla. Stat. § 403.706 (2021) specifies that "The governing body of a county has the responsibility and power to provide for the operation of solid waste disposal facilities to meet the needs of all incorporated and unincorporated areas of the county." This is consistent with Goal 6.0 of the Broward County Comprehensive Plan - Solid Waste Element, which states, "Provide a cost-effective and equitable solid waste disposal system which emphasizes waste minimization and resource recovery and meets all federal, state, and local environmental quality standards," and Objective 6.3, which states, "Broward County shall ensure the availability of solid waste facilities with sufficient capacity to process and dispose of present and future volumes of solid waste, using adopted level of service standards." While the Authority may meet these requirements via contracted capacity, it requires consideration of the associated risks (e.g., financial, environmental, equity) and consideration of the Authority's stated guiding principle to "control its solid waste management

destiny" by developing the services, programs, and facilities such that the Authority takes responsibility for managing the solid waste generated by its members and the outcomes of its decisions. For the purposes of this White Paper, the development of a new landfill within Broward County is assumed. If policy direction is to secure new disposal capacity outside of Broward County, further analysis will be required to assess the transportation mode (e.g., long-haul vehicles, rail).

As detailed in the Task 2 White Paper, MSW generated in Broward County is currently disposed at four landfills, two of which are located within Broward County. However, it is important to note that one pathway for the Authority to "control their solid waste destiny," which is reflected in the following sections, is the consideration of a new Class I landfill in Broward County. However, developing a new landfill is often controversial. To that end, it should be noted that there has not been a new publicly-owned landfill constructed in Florida in more than 25-years. The last publicly owned landfill to open was the Sarasota landfill in 1998. The challenge is due, in part, to a lengthy development process (e.g., siting, permitting, constructing, and commencing operations) requiring between 10 to potentially more than 20-years before the first ton of waste can be disposed once policy direction is provided. Depending on the size and phasing plan designed for the landfill, construction and operation will span multiple decades. Following closure, monitoring will continue for another 30-years. However, throughout the active life of the landfill, the Authority will be able to meet its disposal needs as part of a sustainable waste management approach that can also integrate enhanced waste reduction, recycling, and diversion initiatives to further extend the lifespan of the landfill past the initial designed capacity.

An outline of the timeline expected for siting and opening a landfill is shown in **Table 42**. The estimate for permitting a site is conservative and depends on the required approval from regulatory bodies.

Table 42. Conceptual New Landfill Development Timeline

Task	Estimated Time
Develop concept and budget for proposed landfill, including size and additional onsite facilities	6 months
Perform siting study by determine constraints and ranking potential options	6 months
Site Selection	3 months
Perform due diligence, such as hydrogeological and geotechnical studies, site assessment, and wetlands/ecological surveys	1 year
Property Purchase	1 year
Zoning Approval(s)	2 years
Permitting (FDEP, Broward County, ACOE, etc.)	3 years
Initial Cell Construction	2 years
Commence Operations	-

6.1.16.1 Technical Assessment

The development of a new Subtitle D landfill for Class I waste to support the solid waste management needs of the Authority would offer long term capabilities to accommodate the expected population growth for ILA Members.

6.1.16.2 Siting

A siting analysis would be required to determine viable locations for a new landfill. The task of determining the location, size, design, and operation of an additional landfill and associated solid waste management facility is challenging. The search for potential land for landfill development would begin by determining any available land parcels. Following this first filter, siting criteria, or exclusionary criteria, is developed to account for regulatory siting restrictions, community values and concerns, and current technology. The availability of current and representative data of waste composition and tools to evaluate waste management options also plays a significant role in the process. Additionally, the process by which the decisions are made must be open and transparent to the public.

The exclusionary criteria will be used to filter out any locations violating regulatory and zoning restrictions. Specifically, the following exclusionary criteria must be considered:

- Conservation Areas
- Distance to Airports - FAA Advisory Circular 150/5200-34 imposes restrictions on a location near public airports
- Natural Resource Protection Area (NRPA)
- Distance to Class 1 Surface Water as defined by FAC 17-302.600
- Land Use – Existing areas designated as Urban and Built Up (except Open Land), Transportation, Communication, and Utilities
- Distance to the community water system, as defined by FAC 62-550.200
- Areas of Critical State Concern
- Developments of Regional Impact
- Historical/Archaeological/Cultural areas

Following Authority direction, evaluative criteria would be developed and applied to further screen potential locations within the County. Evaluative criteria are different from exclusionary criteria because they are based on the issues and concerns of the community. A citizen's organization can assist in the process of developing, ranking, and weighting the evaluative criteria. Some examples of evaluative criteria may include protection of regional groundwater; impacts caused by blowing litter, dust, and odors; traffic impacts; effects on surrounding wells; topography; hauling costs, costs of land and roads; impacts on neighboring properties; and landscape preservation. The site identification process can take up to a year to complete, depending on the cooperation of community and regulatory stakeholders.

6.1.16.3 Design Considerations

Lining System and Leachate Management

All disposal cells will have a double composite lining system consisting of a primary and a secondary lining system. Each of the primary and secondary lining systems will include a geocomposite drainage layer, a geomembrane liner, and a geosynthetic clay liner as a composite component to the liner system. Leachate collected in the primary system will be conveyed to a primary leachate sump and liquids collected in the secondary system will be conveyed to a secondary sump. Leachate from each sump will be pumped in independent lines to a common leachate force main after passing through a flow meter to measure flow rate and cumulative flow volume. The leachate force main consists of a double-cased piping system to collect any leaks from the primary leachate force main if it ever occurs. Leachate will be conveyed through a leachate line for disposal at wastewater treatment facility or via a deep injection well.

Surface Water Management System

A surface water management system is required and often consists of a detention pond and discharge to a surface water body.

Gas Management System

The landfill will be equipped with vertical and horizontal gas collection wells. The collected gas will be conveyed through gas headers to a gas management compound where it can wither be flared, or preferably for beneficial use.

Permitting Approach

The following activities are required for permitting a new landfill:

1. Conduct groundwater modeling to confirm compliance with wellfield protection requirements that restrict solid waste disposal facilities in wellfield risk management zones.

2. Conduct a detailed environmental survey of the proposed site including wetlands, connections of water bodies to the United States navigable waters, environmentally sensitive areas, floodplain boundaries, wildlife habitat determination, wildlife corridor easements, endangered species nesting, seasonal use of the land by wildlife, etc.

3. Conduct a detailed technical evaluation of the proposed site. This evaluation should include a geotechnical evaluation, hydrogeologic evaluation, waste and liner stability analysis, leachate generation analysis, waste settlement evaluation, floodplain compensatory storage evaluation, surface water management system evaluation for the entire expansion system, stormwater discharge rate evaluation, etc.

4. Complete the FDEP permitting process:

   – Submit application for a permit in accordance with Chapter 62-701 of the Florida Administrative Code;

   – Publish notice of permit application in a newspaper of general circulation in the area where the facility is located;

- Mail notice of the application to the Chair of the Board of County Commissioners and each state senator and representative serving the jurisdiction in which the project is located;

- After the agency completes the permit review, the agency shall send a copy of the notice of intent to issue or deny the permit to these same elected officials;

- Publish notice of the intent to issue in a newspaper of general circulation in the area where the facility is located;

- In the event of no petition filed with FDEP, the final permit will be issued following the 15-day wait period after the public notice is issued;

- In the event of an acceptable petition is filed, the case will be transferred to the FDEP Administrative Hearing branch for processing the petition and permit; and

- A public hearing may be held by the FDEP if requested by elected officials or the public.

6.1.16.4 Financial Feasibility

The use of a landfill as an end-of-life waste management facility typically offers the lowest cost alternative, although there are many other objective and subjective factors that should be considered. In addition, the planning, development and operational costs depend on various factors, specifically the size and expected capacity of the potential landfill.

For planning purposes, a new landfill is assumed to have a total site area of 640-acres with a disposal footprint of 411-acres with 28 disposal cells. The corresponding landfill life is projected to be between 22 and 36 years of capacity based on the selected scenario, assuming 1,500 lbs/cubic yards of in-place waste density and between 2,100,000 and 3,400,000 tons per year requiring disposal in 2045. The cost for developing a new landfill is estimated between $813,900,000 and $1,131,1000,000, excluding land acquisition.

Table 43 presents the annual required capacity in 2045 under the identified scenarios and **Table 44** presents the estimated landfill cost by scenario.

Table 43. Disposal Capacity needed in 2045

Scenarios	Status Quo	Scenario A	Scenario B	Scenario C	Scenario D	Scenario E
Landfilled Waste (tons)	4,200,000	2,668,057	1,637,986	1,329,797	3,117,322	2,110,080

Table 44. Landfill Cost Estimate by Scenario

	Scenario				
	A	B	C	D	E
Total Area (Acres)	640	640	640	640	640
Disposal Area (Acres)	410	410	410	410	410
Capital Life (Years)	25	34	36	22	30
Tons (Annual)	3,000,000	2,200,000	2,100,000	3,400,000	2,500,000
Capital Cost (Total)	$879,800,000	$1,085,700,000	$1,131,100,000	$813,900,000	$978,500,000
OpEx (Annual)	$228,800,000	$181,600,000	$176,600,000	$261,300,000	$203,400,000
Revenue (Annual)	$381,300,000	$302,700,000	$294,400,000	$435,400,000	$338,900,000
Cost (Per Ton)	$91	$99	$100	$89	$95
Net Dollars (Per Ton)	$41	$41	$42	$41	$41

It should be noted that the financial analysis is budgetary at this stage, as a detailed scope and site-specific parameters have not yet been identified but will be as the master planning process progresses.

7.0 INCREASING DIVERSION

7.1 POLICY APPROACHES & WASTE REDUCTION BEST PRACTICES

Waste-related policies are essential for municipalities to optimize recycling systems and improve waste diversion efforts. These policies can be customized to meet the specific needs and conditions of the Authority. Below is an overview of common local waste-related policies. To achieve a 75% diversion rate, nearly all of the policies listed will need to be implemented.

Scenario D, which employs a wet/dry MSW collection system, is the only scenario where the waste diversion policy significantly differs. In this scenario, policies that require the source separation of food waste from wet MSW and recyclables from dry MSW are not necessary. However, it remains important to implement related policies that ensure proper separation within the collection system.

7.1.1 Waste Diversion Goals

Municipalities often establish waste diversion goals through sustainability plans or resolutions. While some goals adopted may be aspirational and lack dedicated funding or enforcement mechanisms, they serve as a framework for shaping future waste-related policies and programs.

Official diversion goals are typically used by local government and environmental advisory boards to evaluate engagement initiatives and analyze hauler data. These goals provide a basis for long-term planning and improvement of waste management systems.

7.1.2 Florida's Statewide Diversion Goal

Florida's waste diversion goal, established by the Energy, Climate Change, and Economic Security Act of 2008, aimed to divert 75% of MSW from landfills by 2020. This target was designed to mitigate the environmental impacts of waste disposal while promoting recycling, composting, and other waste reduction strategies.

7.1.3 Broward County's Current Status

In 2023, Broward County reported a traditional recycling rate of 30%, with an adjusted total recycling rate of 39%, which includes recycling credits for renewable energy generated from WTE. While progress is ongoing, the Authority continues to work towards achieving the state's ambitious 75% recycling goal.

By implementing and refining waste-related policies, such as the policies that follow, municipalities can enhance recycling efforts, support sustainability initiatives, and align with state and local environmental objectives.

7.1.4 Pay-As-You-Throw (PAYT)

PAYT, also known as volume-based pricing, requires residential waste haulers to offer pricing structures based on the amount of waste generated. Residents are charged according to the size of their MSW cart, bags, or stickers, while recycling (and sometimes composting) carts are provided at no additional cost, the program is tailored to household needs.

PAYT is recognized as a best practice for incentivizing waste reduction and diversion. In Broward County, the City of Plantation operates one of the longest-running PAYT programs in the US,

employing a system of four bag types differentiated by material type and quantity, each priced accordingly. Additionally, carts have been implemented for multifamily and selected communities.

7.1.5 Extended Producer Responsibility (EPR)

EPR, also known as product stewardship, shifts the responsibility for a product's entire lifecycle, including its end-of-life management, from municipalities to producers of packaging. Under EPR, producers or brand owners are accountable for recycling or properly disposing of their products and packaging, either physically or financially.

Through a concept known as eco-modulation, EPR incentivizes producers to design products and packaging that are less toxic, lighter, less bulky, made from recycled content, and more recyclable. This results in environmental, economic, and GHG reduction benefits. Collection under EPR must be free and convenient for all residents to ensure participation, with materials management costs and program planning responsibility and accountability shifted to the producers. Often, the producers work closely with the government entity overseeing the program to ensure that accountability and the costs to run the program are reimbursed to the government by the producers.

EPR is most commonly enacted at the state level, covering items such as:

- Batteries
- Carpet
- Electronics
- Printed paper and packaging (PPP)
- Mattresses
- Medical sharps and pharmaceuticals
- Paint
- Solar panels and wind turbines

7.1.6 Organized Collections

Municipalities can negotiate contracts with one or more waste haulers, incorporating diverse policy elements. Contracts often mandate transparent pricing and recycling services, with options to include PAYT systems, walk-out services, and other waste management enhancements. Homeowners Associations (HOAs) may also establish independent contracts with haulers.

7.1.7 Adequate and/or Equal Space Ordinance

Florida law (Chapter 403.706, F.S.) requires newly developed multifamily and commercial properties receiving certificates of occupancy after July 1, 2012, to provide adequate space for recycling. However, the Authority could adopt stricter ordinances, eliminating exemptions and extending requirements to organics programs once implemented.

An equal space requirement could replace "adequate space" language to aid enforcement and improve diversion. Additionally, a waiver program could be introduced for pre-2012 properties unable to meet physical space requirements, ensuring broader compliance.

7.1.8 No Burn/Bury Policies

Disposal bans restrict the disposal of specific material types in landfills or WTE facilities. While effective for educating the public on keeping certain materials out of waste streams, enforcement

can be challenging without the ability to impose fines or reject tipping loads. These requirements can be included in contracts with landfills and facilities to ensure financial penalties when these items are attempted to be disposed of in these locations. Yard waste and recyclables are common examples of material banned from U.S. landfills.

7.1.9 Harmonized Recycling List

Currently, recycling programs throughout Broward County vary widely, creating confusion and hindering outreach efforts. While a residential recycling ordinance exists, it applies only to unincorporated areas and includes an outdated list of acceptable recyclables (e.g., specifying only narrow-necked plastic bottles without caps).

Establishing a universal recycling list for all jurisdictions within the Authority would simplify participation by ensuring consistency in accepted materials across homes, schools, businesses, and public spaces. A harmonized list would form the basis of effective education and outreach campaigns and lead to less recycling contamination.

Periodic reviews of the list are recommended to account for evolving packaging types and recycling technologies. Updates are needed to ensure continued growth in the volume of recyclables collected and reduced contamination. Any instance where a list is updated needs to signal a new round of education and outreach to ensure that the message is received. Any updates need to be seen seven to ten times by residents and communicated by community influencers.

To implement a harmonized recycling list, the following approaches may be considered:

- Establishing Authority-wide standardized recycling ordinance
- Standardizing hauler contracts
- Voluntary collaboration among municipalities to align accepted materials and outreach strategies

7.1.10 Mandatory Universal Recycling Statute

Universal Recycling Ordinances (UROs) mandate that residential households, commercial properties, including businesses and multi-family housing buildings, provide recycling (and sometimes composting) access to residents, staff, and tenants. Typically, UROs are implemented after successful residential recycling programs and strong community support. UROs ensure that residents and visitors have access to waste diversion services regardless of their location. Broward County currently has a mandatory residential recycling ordinance, but it only applies to single-family and multifamily dwellings in unincorporated areas and excludes commercial properties (§14-71-75).

7.1.11 Mandatory Food Waste Recycling Ordinance

Food waste recycling ordinances mirror universal recycling statutes for food waste and composting. To manage food waste, states and local governments have enacted mandatory food waste recycling laws for commercial sectors generating significant amounts of food waste, such as grocery stores, universities, hospitals, and large restaurants. These requirements typically necessitate source separation of food waste and its delivery to composting or AD facilities. They often include provisions to encourage food waste reduction, donation, and specific food waste utilization for animal feed.

Additionally, phased-in policies may be implemented to gradually expand participation among commercial entities.

The City of Gainesville, Florida, has enacted mandatory food waste source separation and composting for commercial businesses generating greater than one cubic yard of food waste per week. The City of Gainesville, Florida is currently in the process of implementing mandatory source separation, curbside collection, and composting of organic food waste for residents (Ordinance 200381).

7.1.12 Industrial Organics Diversion

While industrial organic waste was not part of the review for this White Paper, the SCS Team presents additional considerations including anaerobic co-digestion of industrial food waste and direct land application of raw shredded green waste (RGW). For more information, please see **Appendix C**.

7.1.13 Food Waste Donation

Some municipalities require businesses, particularly grocery stores and restaurants, to donate surplus food to food banks or charitable organizations to prevent food waste. For example, San Francisco's Mandatory Commercial Organics Recycling Ordinance requires large food-related businesses to donate surplus food to charities, reducing food waste and helping food-insecure communities. These policies can often lead to partnerships formed between municipalities and food pantries / non-profit organizations / churches to connect surplus food to those in need.

7.1.14 Reporting

Broward County already requires haulers to submit monthly reports specifying tonnages and the number of units served (§14-74). The Authority could implement a policy to enhance these reports by incorporating organics and MSW tonnages, as well as material destination. Beyond broad material categories, more detailed information on material types can aid in material management planning. For example, haulers could specify scrap metal, C&D, commingled recycling, or old corrugated cardboard as subcategories. Additionally, recycling facilities, composting, and AD facilities could be required to report tonnage received, tonnage sent to end markets, and tonnage disposed by material type.

7.1.15 Sustainable Purchasing Program

The Authority could adopt sustainable purchasing requirements to establish standards for select products and services purchased by the ILA Member governments. A portion of the budget could be allocated to purchasing products meeting sustainable product standards. Such policies can encourage the purchase of locally generated compost, reduce waste in foodservice contracts, and increase demand for products with recycled content.

7.1.16 Emergency Management Planning

Landfills often serve as the default disposal point for debris generated during hurricanes and other natural disasters. Strategic planning for both collection and disposal of such debris can reduce reliance on landfilling.

7.1.17 Construction & Demolition Debris

C&D recycling ordinances vary in complexity, ranging from simple reporting requirements to more stringent mandates, such as on-site sorting and recycling, and requirements for recycling solutions that must be met by bidders to be awarded construction or demolition contracts by participating municipalities. One widely adopted green building ordinance is deconstruction, a systematic disassembly process that maximizes material recovery and value. Soft-stripping, or materials extraction, involves removing valuable components for reuse. Cities such as Portland, Palo Alto, San Antonio, Boulder, Milwaukee, and Vancouver have implemented deconstruction ordinances. Additionally, various communities across the United States, including those in Colorado, Illinois, Florida, Wisconsin, Washington, Texas, Connecticut, Missouri, North Carolina, and California—have adopted C&D landfill diversion ordinances.

7.1.18 Data

While Florida tracks some recovery, a more detailed assessment of remaining materials in the disposal stream would inform diversion strategies and market development efforts. This analysis should be conducted regularly. A more detailed assessment (waste characterization), done at regular intervals (every five years), of the types of all materials remaining in the disposal stream would inform progress toward diversion of specific materials and the market development efforts that are needed to recover what remains in disposal.

7.1.19 Single-Use Item Bans and Fees

Many jurisdictions have implemented bans or fees on single-use items like plastic bags, fess on all types of carry out bags, straws, and Styrofoam to encourage reusable alternatives. These policies aim to reduce litter and water pollution, though their impact on recycling rates is minimal.

By adopting these policy models, the Authority can significantly improve waste diversion, recycling rates, and overall environmental outcomes.

7.1.20 Textiles Recovery

Many municipalities offer drop-off locations and pickup services for textiles and electronics, facilitating the reuse of these materials or ensuring they are recycled responsibly rather than disposed of in landfills. For instance, New York City's **ReFashion NYC** program provides donation bins for clothing and textiles in residential buildings, streamlining the process for residents to contribute to reuse and recycling efforts. Additionally, innovative services like **Retrievr** now offer convenient home pickup options for textiles, further encouraging participation in sustainable waste management practices (also picks up electronics and shoes). [25]

7.1.21 Spring / Fall Clean-Ups

Some municipalities organize seasonal clean-up events, typically in the spring or fall, or designate specific days for curbside bulk waste collection. These initiatives encourage residents and local donation organizations to repurpose furniture and other household items by "scavenging" reusable goods before waste haulers collect them.

[25] Retrivr picks up electronics, textiles, shoes, and clothing: https://retrievr.com/?utm_source=google&utm_medium=reg&utm_campaign=eac&gad_source=1&gclid=CjOKCQiAo5u6BhDJARIsAAVoDWsvmSIFx36ay1zC00ovxtqpwdiF2OvoAXmdgDaoRdF-I0XUV-jOQyUaAlfWEALw_wcB

An alternative approach involves coordinating curbside setouts for furniture and donation-eligible items, allowing nonprofit organizations to preemptively collect these materials for donation and reuse. This method can be implemented on a prescheduled basis, with communication to residents in advance, enabling nonprofits to drive designated routes ahead of refuse or bulk collection services. This strategy not only reduces waste sent to landfills but also promotes community engagement in sustainability efforts.

7.1.22 Grasscycling

Grasscycling is a practice where residents are encouraged to mow their lawn and leave their grass clippings without bagging for disposal. The grass clippings that are left on the lawn help restore nutrients back into the soil, conserves water and improves overall quality and health of the lawn. In Florida, St. Augustine grass and Bermuda grass are the most commonly used for lawn grass and are well suited for grasscycling and leaving the clippings on the lawn after mowing.[26] Lawn clippings left on the grass also saves time and effort for the resident from bagging, as well as reducing the amount of waste going for disposal.

7.1.23 Backyard Composting

Municipalities across the United States are increasingly promoting backyard composting as a key strategy to reduce household waste, decrease landfill reliance, and advance sustainability goals. It is recommended that the Authority develop a backyard composting program to accompany all five scenarios as a means of encouraging residents to be more informed about the impacts of food waste on the environment and to foster personal responsibility to manage waste more sustainably.

Some cities incorporate backyard composting into their broader zero-waste or waste-reduction strategies, using mandates or incentives to encourage residents to divert organic waste from landfills. For example, in San Francisco, the Zero Waste Program mandates that residents compost food scraps and yard waste. While curbside compost collection services are provided, the program also promotes backyard composting as an effective and sustainable alternative. These efforts often involve providing education, resources, and incentives to residents while collaborating with nonprofits and community organizations to implement and support composting initiatives.

Municipalities often offer free or discounted compost bins to residents to encourage them to start composting. Some may even provide additional tools such as aerators or compost covers. For example, San Francisco offers residents compost bins at a reduced cost and provides additional composting materials upon request. The District of Columbia offers a rebate of up to $75 to residents who purchase home composting systems from the Department of Public Works (Zero Waste DC, n.d.). In Austin, Texas, the Resource Recovery program provides $75 rebates on compost bins as part of its Home Composting Rebate Program. [27]

Many municipalities offer free or low-cost workshops to educate residents about backyard composting. These sessions typically cover topics such as constructing and maintaining a compost pile, selecting appropriate materials, and addressing common challenges. For instance, the City of Seattle regularly conducts composting workshops through its partnership with the Master Composter/Sustainability Steward (MC/SS) volunteer program. This initiative empowers residents to

[26] University of Florida Grass-cycling. https://sfyl.ifas.ufl.edu/sarasota/natural-resources/waste-reduction/composting/what-is-composting/what-can-be-composted/grass-cycling/
[27] https://www.austintexas.gov/homecompostguide

build worm bins, recycle food and yard waste, and foster sustainable practices like reducing, reusing, and building healthy urban soils.

Similarly, municipalities often partner with nonprofit organizations to enhance outreach and engagement. For example, the City of Los Angeles collaborates with local environmental groups to host composting workshops and distribute educational materials to the community.

7.2 EDUCATION AND OUTREACH APPROACHES

All recycling guidelines evolve over time. These changes are essential to keeping up with market fluctuations, advancements in recycling technology, updates to waste hauling agreements, and in situations like Broward County, where a countywide or regional solid waste authority is formed. However, people generally don't expect these shifts and often lack the up-to-date information needed to recycle correctly. Many believe they know how to recycle, but when tested, they're frequently mistaken, confused, or relying on outdated information.

As packaging design, recycling innovations, and materials management programs continue to evolve at a faster pace, we need a robust "communications infrastructure" that matches our collections systems. This will help bridge the gap, encourage people to adapt to ongoing changes, and make learning about recycling more accessible, engaging, and rewarding.

Without consistent information, feedback on recycling habits, or a clear resource for answers, people often create their own recycling methods. Unfortunately, these are often based on misconceptions or outdated knowledge, leading to unintentional mistakes. This contributes to the contamination of as much as 25% of collected recyclables, which can no longer be processed, as reported by the USEPA.[28]

Each of the scenarios described in this White Paper assumes a significant investment in education and outreach to achieve the projected waste diversion rates. Task 8 of this project provided a detailed account of best practices when crafting an integrated education, outreach, and marketing.

The three main themes around behavior change include the following:

1) **Access** - Access typically refers to whether recycling bins are available at a place of residence or whether residents have to walk or drive to drop-off centers. This further reflects factors that influence a person's ability and opportunity to recycle. Do people have convenient access to the services and recycling bins necessary for successful participation? Is it as easy for them to recycle, compost, etc. as it is to throw it away?

2) **Knowledge** - This involves the information people need in order to make decisions about what, when, and how to recycle. Are there clear guidelines on what belongs in the recycling bin, such as on-container labels, mailed guides, or online resources? How frequently are they receiving updates and reminders? Do product and packaging labels support or hinder their understanding?

3) **Engagement** - This is more abstract and involves an individual's values, beliefs, attitudes, and identity, as well as the social dynamics and norms within their household and

[28] U.S. GAO: Recycling Facts and Figures. https://www.gao.gov/products/gao-21-87#:~:text=Based%20on%20GAO%20analysis%20of,products%20(see%20fig.).

community. Essentially, it addresses the question: once someone has access to recycling and the necessary information, will they actively participate, and will they do so correctly?

Access

Section 4 of this White Paper details the facility types, that residents will have access to for their recycling, reuse, or other disposal methods. Ensuring that each resident has the opportunity to recycle, compost, or reuse materials that are at their end-of-life in their households is as easy as throwing something away, is vital to the success of any materials management program. It is essential that all residents, regardless of their ethnicity, primary language, or socioeconomic status have the same access to these programs and that the instructions they receive to participate in the programs are in their language of choice.

Knowledge

A strong investment in education is necessary to ensure that people are well-informed and motivated to dispose of waste properly. This strong level of investment can boost a recycling rate beyond what could be achieved with infrastructure improvements alone. Based on research in various US communities[29] from TRP, a national nonprofit that is the gold standard on recycling education, it was found that combining access to recycling with comprehensive education not only improves and maintains high recycling rates, but it also results in cleaner materials for RMPFs and reprocessors.

Resident confusion is one of the key reasons why they do not recycle correctly.[30] Therefore, when trying to reach residents across municipal boundaries, it is best to harmonize the list of what can and can't be recycled, in order to reduce confusion. That way, if someone works in Lauderhill, but lives in Coral Springs and goes to the beach in Pompano Beach, they can be certain that they are recycling correctly no matter where they are. Harmonization, and consistency in messaging (look and say the same things across municipal boundaries) are crucial to reducing resident recycling confusion and thereby reducing contamination. Making it easier to understand how and what to dispose of where, will likely result in increased participation.

Making knowledge easy to access is also a key factor in reducing contamination and increasing participation. It is important that residents know what website, tool, or smart app, such as Recycle Check, to access to get their most up-to-date information. If a smart app is not obtainable due to cost, a tool can be integrated into the website, called a Waste Wizard, that can be used by residents to determine how best to dispose of a specific product or material. However, residents need to know that these tools are available and need to be able to understand the information provided.

A best practice approach is to send a mailer three times a year that residents can hang on their refrigerator with a list of what is and isn't to be disposed of on what day (including a schedule), and also a postcard that specifically mentions a top contaminant. There are several Smart Apps for recycling that can assist the Authority in implementing a harmonized program (see the Task 9 White Paper). Ensuring that the database that backs up the App, and the website itself is updated regularly, is imperative to a successful program.

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[29] Resource Recycling: *The Cost of Transformation*. https://resource-recycling.com/recycling/2021/08/15/the-cost-of-transformation/

[30] The Recycling Partnership: *Consumer Research on Recycling Behavior*. https://recyclingpartnership.org/consumer-research-on-recycling-behavior-and-attitudes-regarding-on-pack-labeling/

In order to measure these education approaches and then have them working complementary with operations, a "Feet on the Street" (FoTS) program is a best practice. Ideally, a postcard with what is and isn't recyclable (this can be used for food waste and other disposal options as well), goes out three to five weeks prior to FoTS. The week before the FoTS program is scheduled to start, send a notice via text or email to let the resident know about the program and its purpose. FoTS is when you hire local temporary labor, led by key experts, to walk around neighborhoods (a specific rout and time is designated), and have staff check what's in the disposal carts. A door hanger is left on the cart or the door of the residence with boxes checked by contaminants that were in the disposal cart or other things that need correction.

Keeping track of what residents on a particular route needed to be notified of, another mailer can be sent to that neighborhood or route and call out a top contaminant or a top behavior that needs to be changed. It can then be tracked again after the full FoTS is completed through a waste audit.

Another method of bringing complementary educational tools to a household is by implementing a school curriculum so that school-aged children are aware of how, what, and when to dispose of what items from their homes. There are several available curriculums to help the Authority implement a similar program. After the Solid Waste Authority picks what type of program they will implement, a curriculum should be specifically designed to reflect the program.

Engagement

A fully optimized recycling collection and processing system, however, cannot reach its full potential without effective education, outreach, and community engagement. It's not enough to just "tell" residents what it is they need to know. They must be met where they are by people they trust.

This means determining what residents already know through surveys and focus groups, what the obstacles are to them understand what and how to recycle such as access, language barriers, and more, and determining what method of outreach can best reach and teach them, whether it be schools, religious leaders, government leaders, or others.

Engaging community leaders from a wide range of special interest groups, homeowner's associations, religious and service organizations, educational teams, museum staff, as well as a diverse range of media personalities, satisfies a best practice requirement of finding someone your residents trust to deliver the most updated information.

Whether it's on a community message board, spoken about at regular meetings, briefed on during a sermon, educated on in schools, presented in a museum, or a 10-second blurb on the radio, the information meets people where they are and where they want to get their information from.

By harmonizing the disposal program across jurisdictions, you also have the opportunity to provide consistent messaging from the Authority and municipalities that are a part of the program. When a resident sees information seven to ten times a year, they are more often to implement that behavior, whether that is correcting the way they dispose of materials and thereby reducing contamination, or getting residents to start new behaviors, thereby increasing participation.

Jurisdictions can get this message out via their social media channels, included in utility bills, and sent out via email regularly, to name a few. These channels come at very little cost but go a long way toward awareness of the program and consistency of message.

If there are additional funds in the budget, it is also a best practice to advertise to the community through social media. Short video and audio messages can be created and then sent to residents via social media through targeting. Targeting can be done via zip code, street address, city name, and more. The more targeted the message, the more costly it can be, but also the higher the return on investment.

Traditional methods of outreach through billboards, newspaper advertisements, television, and radio advertisements can also be included in approaches if budget is there to accomplish these tactics.

All of the above best practices together complement each other and work best when all are implemented as part of an integrated communications, education, and engagement plan.

Costs of Engagement

As was discussed at the first Executive Committee of the Authority meeting about the Solid Waste Management Plan, there is a cost to an integrated communications, education, and engagement plan. TRP calculated the educational costs using insights from seven years of data and found that that addressing contamination at the curb costs approximately $3 to $5 per household annually and significantly reduces material contamination. In addition, ongoing education is essential for building recycling knowledge and public trust, which encourages greater participation.

The true costs of education in cities of different sizes were examined, operating under the principle that people need to be informed at least seven times a year to develop consistent recycling habits (based on best practices discussed in detail in Task 8). The additional expenses necessary to raise awareness of schedules, program details, and the importance of recycling were also included in the cost estimates.

Ultimately, TRP estimated that an investment of $10 per household per year is required to fully enhance recycling education.[31]

7.2.1 Operational Approaches

7.2.1.1 Special Collection Programs

A significant portion of the current municipal waste stream is hard to recycle materials. As part of the set of integrated strategies, regional Zero Waste Centers will need to be established to collect these hard to recycle materials. To maximize collection of special waste, curbside collection of special waste or specific materials streams curbside can be offered periodically (monthly, bimonthly, seasonally, or biannually) or on-demand curbside selection services can be utilized.

There are a number of technology options for supporting periodic or on-demand curbside collection. Smart apps can be utilized both to remind residents of scheduled services as well as to request and schedule on demand services (discussed in more detail in task 9). Convenience of curbside service also can be either charged to the resident when the service is scheduled or covered by the Authority.

[31] The Recycling Partnership: *Paying It Forward Report* https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2021/05/Paying-It-Forward-5.18.21-final.pdf

Table 45 presents examples of communities that utilize periodic or on-demand waste collection services for various types of waste streams. If desired, a third-party company can be contracted for both drop-off centers and periodic and/or on demand curbside collection.

Table 45. Community Examples of On-Demand Waste Collection Services

Item Collected	How Service is Offered	Jurisdiction
Batteries, electronics, HHW	Third Party, On-Demand, QR code/website for scheduling, Paid for by Household at Time of Scheduling	Arapahoe County, CO
Textiles	Third party, On-demand, registration form on website, free for residents and city government	Boston, MA
Brush, Scrap Metal/ Appliance	Scheduled through website, On-demand, free, service provided by county services	Arlington, VA

For multifamily buildings, options can be made available for property managers to schedule collection events onsite each season for clothing and textiles, scrap metal, and bulky waste, electronics and HHW.

7.2.2 Technologies to Assist with Measurement, Targeted Outreach, and Enforcement

There are a variety of hardware and software systems that can be utilized to assist with measuring and tracking program performance as well as in deploying targeted outreach or enforcement.

7.2.2.1 RFID Systems

The Authority can include requirements for haulers to equip vehicles with a county-approved Radio Frequency Identification (RFID) reader capable of reading carts with RFID tags. The RFID systems will allow the Authority to establish participation and capture rates, measurements which will help evaluate and track progress toward collection goals. The data can then be used to focus funding and outreach on specific additional education, engagement, evaluation, and enforcement efforts to boost further diversion.

Additionally, RFID readers may be used to keep haulers accountable for tracking missed collections and early starts for noise complaints. The Authority may also establish requirements that haulers must equip their collection vehicles with Automated Vehicle Location (AVL) Systems, a global positioning system (GPS) capable of identifying and logging the direction of travel, speed, major braking or accelerating events, and logging of the collection vehicles during the route day. This data can further support safety initiatives and route optimization efforts to reduce emissions and assist in ensuring that haulers are taking materials to the correct place (e.g., not taking recycling loads to a Municipal Solid Waste facility), and ensuring no early starts that can lead to noise complaints.

7.2.2.2 Camera Systems to Monitor and Track Curbside Cart Contamination

Trucks also may be outfitted with camera systems such that pictures of carts or inside of a cart can be taken when being tipped. A software system can then be used so that the driver can indicate the cart contains contamination and associate a picture with the note. This is helpful in automating communications to residents for enforcement related to violations or for targeted communications

regarding recycling and trash management practices. AI-enabled camera systems, which can identify types of contamination, are also beginning to be deployed in trucks. WM reports that trucks deployed with this technology, combined with targeted outreach and education, can reduce contamination by up to 20%. [32]

7.2.2.3 Handheld Automation

In addition to automation systems for haulers to collect data during collection, another option is to utilize street teams periodically throughout the year for data capture and to capture data on a phone-based app or similar (known as Feet on the Street and described in further detail in Task 8). This program can be utilized to track cart set out rates, contamination in bins, overflowing trash and recycling bins, and whether outreach materials were left for the household on the cart.

7.2.2.4 Automated Cameras on Drop-Off Containers

Cameras can be added to dumpster and drop-off containers and more broadly at drop-off container sites. Cameras placed in dumpsters can measure fullness and take pictures to show contamination within the bins. This can be helpful to ensure efficient collection of drop-off bins. Outdoor cameras also can be used at drop-off sites to identify any illegal dumping, and vandalism type issues.

7.2.2.5 Reuse Directories

Reuse directories serve as either online or physical resources, listing local businesses, nonprofits, and centers where residents can donate or purchase second-hand items. These directories facilitate the reuse of goods such as clothing, furniture, electronics, and household items. For example, the City of Alexandria, Virginia, has developed an online Reuse Directory. This platform connects residents with organizations that accept a diverse range of items for donation or resale, thereby diverting waste from landfills and extending product lifespans.

The directory includes:

- **Donation and Resale Options:** Nonprofits and churches that accept household items, furniture, textiles, shoes, toys, and even food for redistribution.
- **Repair Services:** Information on local businesses offering repair services for items like bicycles, instruments, and electronics, helping residents restore rather than discard items.
- **Plastic Bag Recycling:** Drop-off locations at partnering retailers and grocery stores for plastic bag take-back programs.
- **Zero-Waste Shopping:** A list of businesses encouraging package-free and refill shopping, where residents can bring their own containers to minimize single-use packaging waste.
- **Safe Disposal Programs:** Permanent and event-based drop-off points for prescription medications, ensuring environmentally responsible disposal. This initiative exemplifies how a centralized resource can empower residents to make sustainable choices and reduce overall waste.

[32] https://www.wastedive.com/news/ai-truck-mounted-cameras-contamination-identification-wm-the-recycling-partnership/711099/

7.2.2.6 Sharing and Exchange of Reusable Materials

Many cities have established online platforms to facilitate the exchange of reusable materials among residents and businesses. These platforms often feature items like building materials, furniture, appliances, and even surplus food, available for free or at reduced costs. By connecting individuals and organizations, these exchanges promote circular use of resources and further reduce waste. These strategies underscore the importance of local-level collaboration and innovation in advancing sustainable waste management practices.

Austin, Texas, operates a ReBlend Paint Reuse Program, where residents can drop off unused paint at recycling centers and then the City redistributes it to those in need.[33] In Cambridge, Massachusetts, their recycling drop-off center includes a share table where residents can bring and pick up items (e.g., 3-ring binders in excellent condition, books, etc.) to encourage reuse.[34]

Many municipalities offer free or low-cost workshops to educate residents about backyard composting. These sessions typically cover topics such as constructing and maintaining a compost pile, selecting appropriate materials, and addressing common challenges. For instance, the City of Seattle regularly conducts composting workshops through its partnership with the Master Composter/Sustainability Steward (MC/SS) volunteer program. This initiative empowers residents to build worm bins, recycle food and yard waste, and foster sustainable practices like reducing, reusing, and building healthy urban soils.

Similarly, municipalities often partner with nonprofit organizations to enhance outreach and engagement. For example, the City of Los Angeles collaborates with local environmental groups to host composting workshops and distribute educational materials to the community.

7.2.2.7 Online Resources

Municipal governments also provide comprehensive online tools, including guides, instructional videos, and downloadable resources, to support residents in adopting backyard composting. In Portland, Oregon, the city offers a detailed home composting guide on its municipal website, with translations available in languages such as Russian, Vietnamese, Chinese, and Spanish to ensure accessibility for diverse communities.

Through a combination of educational initiatives, partnerships, and accessible resources, municipalities are empowering residents to embrace composting as a practical and impactful way to contribute to waste reduction and environmental sustainability.[35]

Similarly, municipalities often partner with nonprofit organizations to enhance outreach and engagement. For example, the City of Los Angeles collaborates with local environmental groups to host composting workshops and distribute educational materials to the community.

[33] https://www.austintexas.gov/reblend
[34] https://www.cambridgema.gov/services/recyclingcenter
[35] https://www.portland.gov/bps/garbage-recycling/compost

8.0 FINANCIAL EVALUATION FOR FUTURE CAPACITY NEEDS

Establishing the Authority is a complex endeavor, particularly because it begins with no existing facilities or staff, and only the Executive Director at the helm.

The foundation of effective financial planning for the Authority lies in the comprehensive analysis of anticipated revenues and expenditures. This process is called revenue sufficiency analysis.

A revenue sufficiency analysis involves comparing projected revenues (e.g., from recycling processing fees or disposal charges) against expected expenditures. These expenditures include day-to-day operational costs (e.g., staffing, maintenance, fuel) and larger capital expenses (e.g., building facilities like transfer stations, RMPFs, and yard waste processing plants). The analysis identifies whether the Authority has sufficient income to cover both current and future financial needs, and if not, it helps pinpoint the gap that may need to be filled by additional funding sources such as loans, bonds, or fee increases.

8.1 ESTIMATING INITIAL REVENUE

The first step in the revenue sufficiency analysis involves estimating the potential revenue from the Authority's primary sources, such as waste disposal fees, special assessment revenues, tipping fee surcharges, or any other revenue mechanisms the Authority may have at its disposal. As the Authority is newly established, the revenue diversification opportunities may initially be limited to the revenue mechanisms that apply to its current operations and facilities.

For example, in the initial stages, the Authority will rely heavily on waste disposal fees from residents and businesses. This revenue stream can be projected based on the population size, waste generation rates, and proposed fee structures. Additionally, securing financial support from local government entities can provide a stable revenue base to cover initial operational costs.

As facilities are constructed, the Authority can bond for the construction of the facilities and utilize non-ad valorem special assessments to recover the costs of debt service from benefitting parcels in the County. These additional facilities can charge for services provided to cover the cost of operations. For example, the RMPF will charge recycling processing fees.

8.2 PLANNING FOR CAPITAL EXPENDITURES

As the Authority begins to develop its infrastructure, capital expenditures become a significant consideration. The analysis must account for the costs associated with acquiring land, constructing facilities, and purchasing essential equipment. The engineers will help the Authority determine the capital costs themselves. The revenue sufficiency analysis will determine whether the projected revenue is adequate to cash-fund these capital costs or if additional funding through loans, grants, or bonds will be necessary.

8.3 PLANNING FOR NEW PROGRAMS & SERVICES

As the Authority develops and expands, planning for new programs and essential services becomes an important part of the Authority's responsibilities. Such programs and services improve the efficiency of waste management and play a key role in community engagement.

For example, the Authority will need to allocate funds for education and outreach. This involves raising public awareness about waste reduction, recycling programs, and the importance of

sustainable waste management practices. Effective outreach can reduce contamination in recycling streams, promote waste diversion, and encourage residents and businesses to properly sort their waste. The Authority will likely invest in creating educational materials such as brochures, website content, and social media campaigns. These efforts might include conducting workshops, school programs, museum exhibitions, and community events aimed at educating residents about the services offered and how to participate in waste diversion programs (see Task 8 white paper for more details).

The budget for these programs will need to cover costs for staffing, marketing materials, outreach events, public speaking engagements, smart apps, and more. The Authority may also need to develop partnerships with local schools, community organizations, or environmental groups to amplify the impact of these initiatives. As new facilities are built and more services are introduced, these education programs will likely need to be scaled up to reflect the expanded materials management offerings, ensuring that the community remains informed and engaged.

Outsourcing the collection of waste and recyclables is another key consideration for the Authority as it grows. The decision to outsource waste collection or recycling services can provide flexibility and allow the Authority to focus resources on other areas, like facility operations or expanding services. However, outsourcing will require careful planning, including evaluating and selecting service providers, negotiating contracts, and monitoring the performance of the contracted services.

The Authority will need to ensure that contracts with third-party providers are structured to incentivize performance, such as timely collection, proper recycling practices, technology inclusion, and adherence to environmental standards. The contracts may also include clauses for performance monitoring, service audits, and penalties for non-compliance to ensure that the contractor meets the expected service levels.

As these programs evolve, the Authority will also need to ensure that there is adequate communication with residents and businesses about the changes, whether it is outsourcing collection services or promoting new educational initiatives. The Authority should plan for clear messaging to minimize confusion and ensure the smooth implementation of new strategies.

8.4 PLANNING FOR OPERATIONAL NEEDS

8.4.1 Staffing Requirements

As the Authority expands its facilities and services, the need for additional staff will grow. The development of new facilities will necessitate hiring operational staff, administrative personnel, and specialized roles such as equipment operators and facility managers.

In addition to staffing, professional services are considered in estimating operating costs. The Authority will need to account for costs during the infrastructure development phase, which includes wages, professional services costs, and facility procurement and/or capital investment.

Once the infrastructure is developed, the Authority will need to estimate the ongoing labor costs for permanent staff, such as operators, maintenance workers, supervisors, and administrative personnel. These staffing costs will depend on the size and complexity of the facility and will scale with the size of the facility or as the facility begins to accept more volume/tonnage.

8.4.2 Other Operating Costs

After construction of the facilities and implementation of the services and programs, the Authority will need to consider the costs associated with program management and operating and maintaining the facilities on a day-to-day basis. This includes maintenance costs to ensure the facility and equipment remain functional, as well as utility costs for electricity, water, and fuel for operational equipment.

The Authority will also incur expenses for consumables, such as safety supplies, office materials, and other operational necessities. Additionally, there may be waste disposal or processing costs, depending on whether the Authority owns and operates certain facilities. These costs will vary depending on the volume and type of waste and recyclables accepted at the facility.

The Authority will need to allocate funds for ongoing compliance with environmental regulations, which may include costs for testing, reporting, and maintaining necessary permits. Insurance costs will also need to be factored in, including property insurance for the facility, liability insurance for operational risks, and workers' compensation insurance for staff.

Finally, the Authority must consider the depreciation of both the facility and the equipment over time. This includes planning for the eventual replacement of machinery and making sure that funds are set aside to maintain or replace worn-out equipment or infrastructure.

8.4.3 Adjusting the Revenue Base

To meet the growing needs of the Authority, it may be necessary to expand the revenue base. The revenue sufficiency analysis will guide decisions on how and when to adjust fees or seek additional funding sources to support the Authority's financial requirements.

8.5 DETERMINING FEES

Once the total costs have been estimated, the Authority has the revenue requirement for its fees. The fee structure is typically based on the programs and services offered and volume or type of waste processed at the facility. For example, the Authority may charge a fee per ton for waste disposal, a fee per ton for recycling processing services, and may have different rates or fees for specialized or one-time services, such as large items, yard waste processing, or hazardous waste disposal.

The Authority will also consider the pricing models used by other similar facilities in the region, considering local economic conditions and the ability of residents and businesses to pay these fees. It may opt for a tiered-fee structure, where different rates are applied based on the type of service (e.g., residential vs. commercial waste) or the amount of waste generated. This structure allows the Authority to ensure that fees are both fair and sufficient to cover the costs without imposing undue financial strain on certain groups.

In addition to covering operational and capital costs, the Authority will need to ensure that its fees are competitive and reflect the value of the services provided. Public engagement will be necessary to gauge community support for the fee levels, especially if fee increases are required to cover growing operational needs or expansions.

Lastly, the Authority will need to review the fees periodically to ensure they remain sufficient as the facility grows and as costs change. This could involve adjusting the fee structure to account for labor

cost inflation, changes in waste volume, or new services that the facility begins to offer. The overall goal is to ensure that the facility generates enough revenue to meet its operational and financial goals without burdening the community it serves.

8.6 SEEKING EXTERNAL FUNDING

In some cases, the projected revenue may not be sufficient to cover all the anticipated costs, and the level of rate/fee increases required may be too high to be reasonably implemented. The Authority may need to seek external funding for critical capital projects through loans, grants, or bonds. The analysis will identify potential funding sources and assess their impact on the Authority's financial stability. By diversifying its funding streams, the Authority can mitigate financial risks and ensure the successful implementation of its projects.

8.7 EXTERNAL FUNDING OPPORTUNITIES

There are a significant number of federal and private grant opportunities that can be used on capital equipment for waste diversion activities and outreach programs. **Table 46** presents a summary of available grants that have been offered for one (1) or more years. Grant programs, particularly at the Federal level, are dynamic and may change from year to year.

Table 46. Previously Available Grant Programs

Name	Amount Range	Description	Due Date
Sustainable Materials Management Grants: EPA Region 4	Up to $250,000	Must address municipal and/or industrial recycling markets, or strategies for preventing food loss and waste through source reduction. Must include research, investigation, experiments, education, training, studies and/or demonstration of innovative techniques.	Dec 2, 2024
USDA Community Food Projects	$25,000 - $50,000	Integrate actionable plans or activities that would reduce food loss and waste within the local food system by keeping food in the human food supply chain and ensuring that such actions are directly tied to reducing community food insecurity.	Nov. 7, 2025; Oct. 30, 2025
USDA Composting and Food Waste Reduction Pilot Project	$75,000 - $400,000	Projects that meet one (1) or more of the following objectives: • Reduce municipal food and waste • Divert residential and commercial food waste from landfills. • Increase agricultural producers' access to compost • Reduce reliance on, and limit the use of, chemical fertilizer • Improve soil quality • Encourage waste management and permaculture business development.	Sept 4, 2024

Name	Amount Range	Description	Due Date
Recycling Partnership Cart Grants	Up to $825,000 Cart funding typically ranges from $5 to $15 per cart and funding is also available to support the education and outreach expenses associated with a cart project, typically at $1 per household.	Funds residential recycling curbside carts and outreach activities associated with roll-out for communities implementing a new cart-based curbside recycling program; Converting existing bin or bag-based program to carts; or Expanding service area to improve access and equity	Rolling
Recycling Partnership Residential Recycling Drop Off Program Grants	Not listed	Development and expansion of residential drop-off recycling programs, especially for projects Focus is to increase volume of collected household recyclables.	Rolling
Recycling Partnership Multifamily Recycling Program Grants	Not listed	To advance recycling and increase equity at multifamily properties to develop new and improve existing recycling programs	Rolling
Closed Loop Fund	$1 – 5 million Loans	For RMPFs, drop sites, trucks, and curbside. Low interest capital infrastructure loans.	Rolling/ongoing
EPA Solid Waste Infrastructure for Recycling (SWIFR)	$500,000 - $5M	Collection, RMPF, and AD facility funding	Dec. 2024; Funds may be available Annually through FY 26
Industry Grants	$5,000 – 500,000	Material specific support for recycling; often for equipment upgrades at RMPFs or drop off; may include outreach allocation	Varies

8.8 FUTURE CONSIDERATIONS

As new programs and services are developed and facilities are constructed, it will be essential for the Authority to continually review and refine its fee structure and revenue sufficiency analysis to maintain financial stability and effectively address its evolving needs. This ongoing process will be necessary to account for potential discrepancies between initial projections and actual operating costs, as well as to identify new revenue opportunities that may arise as services expand.

At the outset, the Authority will make assumptions regarding the costs associated with facility construction, including capital expenditures (such as building and equipment costs) and operational expenses (such as staffing, maintenance, and utilities). However, as design work concludes and

construction begins, capital costs may fluctuate. Once the facilities are operational, the Authority will gain a clearer understanding of actual day-to-day costs, including unforeseen expenses such as equipment breakdowns, higher-than-expected energy consumption, or unanticipated staffing needs.

As real operating data becomes available, the Authority will need to update its financial models and adjust fees to reflect the actual cost of services. This might include increasing fees to cover any cost increases or re-adjusting the allocation of expenses across different services, ensuring that the overall revenue meets operational and capital needs.

As more facilities are constructed and new services are introduced, the Authority will likely have to expand its revenue model. If the Authority begins offering composting, yard waste processing, or specialized services for hazardous waste, it will need to determine appropriate fees for each service, considering factors such as service volume, equipment costs, and labor requirements.

In addition to adjusting operational costs, the Authority will need to evaluate the various revenue mechanisms available as services expand. This could include exploring revenue from new sources, such as grants, P3s, or fee-for-service models for specific waste types (e.g., a different fee for commercial waste or bulk pick-up). If the Authority can access state or Federal grants or other external funding, these can be incorporated into the revenue model to offset some of the facility costs, reducing the pressure on residents and businesses to cover the full cost through fees.

Over time, the Authority may also encounter opportunities for operational efficiencies, such as automation of sorting processes or the use of renewable energy at its facilities. These efficiencies can help reduce costs, and the Authority will need to assess how they impact the revenue and fee structure.

The Authority will need to periodically refine its revenue sufficiency and fee structures as it gains more operational data, expands its services, and explores new revenue mechanisms to ensure that it can adequately support the Authority's ongoing operational and capital needs while maintaining fairness and sustainability.

8.9 COST COMPARISON

As part of the future needs assessment project, the SCS Team was engaged to compare current costs and revenue projections for Broward with Miami-Dade County and Palm Beach County, which are presented in **Table 47**. Where there are both cost and revenue items, these are presented as net cost. For the annual operational costs of MSW collection and processing, Broward's costs are comparable to Palm Beach County and higher than Miami-Dade. For the operational costs of recyclables collection and processing, Broward's costs are lower than Palm Beach County and higher than Miami-Dade County. Based on current analysis, the difference in operational cost is unlikely to be because of varying county practices in terms of owning assets, P3s, or through contracted arrangements. Land acquisition and facility construction costs were not included.

Table 47. Comparison of Operating Costs between County Waste Programs

Overall MSW Collection + Processing	Quantitative Units	Broward[36] (Current)	Palm Beach[37] County	Miami-Dade[38]
	$/HH/year	$169.61	$165.67	96.32
Recyclables Collection	$/Ton ($/HH/year)	$161.6 ($70.55)	$406.49 ($130.47)	$47.06 ($24)[39]
Recycling Program Administration/ Education	$/Ton ($/HH/year)	$11.37 (4$.96)	$44.83 ($14.39)	$2.06 ($1.05)[40]
Recycling Processing (Sorting Efficiency)	$/Ton ($/HH/year)	$105.99 ($46.27)	$71.11 ($22.82)	$78.5 ($40.04)[41]
Overall recyclables collection + processing	**$/Ton ($/HH/year)**	**$278.96 ($121.78)**	**$522.43 ($167.68)[42]**	**$127.62 ($65.09)**
Recyclables	Annual Tons	194,122	111,093	178,507
Number of households (total)	# of Units	802,183	692,251	1,040,743
Participating in recycling	# of Units	444,655[43]	346,126[44]	350,000[45]
Recyclables received per household	Tons/Units	0.44	0.32	0.51

[36] Based on data provided by the Authority.
[37] Based on reported costs unless otherwise stated https://swa.org/DocumentCenter/View/4799/2021-Component-Cost-Summary---FY-2020-Issued-January-2022
[38] Based on adopted budget for program unless otherwise stated https://www.miamidade.gov/global/management/budget/adopted-fy-2024-budget-neighborhood-infrastructure.page
[39] Kessler Consulting, Inc. Recycling Analysis and Program Planning July 2021 Table 5 $/HH/month for EOW SS collection
[40] Difference between adopted budget reported figure and those estimated by Kessler Consulting
[41] Kessler Consulting, Inc. Recycling Analysis and Program Planning July 2021 Table 6 Cost per ton for SS
[42] Only considers collection, transfer, recovered materials processing facility and recycling programs administration costs for comparison with data available for other counties
[43] https://floridadep.gov/sites/default/files/Broward_2020.pdf
[44] https://floridadep.gov/sites/default/files/Palm_Beach_2.pdf
[45] https://www.miamidade.gov/global/management/budget/adopted-fy-2024-budget-neighborhood-infrastructure.page

9.0 FACILITY RISK ASSESSMENT MATRIX

9.1 INTRODUCTION TO FACILITY RISK ASSESSMENT

Effective infrastructure planning requires a thorough understanding of the risks and barriers associated with both current initiatives and proposed strategies. Section 9 presents a comprehensive facility risk assessment matrix designed to evaluate the long-term impacts and potential success of infrastructure approaches.

The assessment considers a range of critical factors, including[46]:

- **Cost:** Financial feasibility - including initial investments, ongoing maintenance expenses, and funding sources.
- **Cultural Barriers:** Societal acceptance and adaptability to changes introduced by the strategy.
- **Political Barriers:** Legislative and regulatory challenges, stakeholder support, and policy alignment. Low mean minimal political barriers
- **Geographic Constraints:** Physical and environmental limitations that may impact implementation and sustainability.
- **Environmental Justice:** Ensuring equitable distribution of benefits and burdens across all communities, particularly marginalized or disadvantaged groups, while avoiding disproportionate negative impacts. Low means minimal negative impact on disadvantaged groups.
- **Likelihood of Success:** Assessing the probability of achieving desired outcomes based on resource availability, stakeholder cooperation, and potential risks or obstacles.

Each facility type is analyzed within this framework to determine its likelihood of success, offering a clear, evidence-based opinion on its potential outcomes. The matrix presented in **Table 48** provides decision-makers with a structured approach to prioritize investments, mitigate risks, and align infrastructure planning with long-term goals.

[46] While diversion potential is included in the scenario screening factors, it is not included in the facility risk assessment as it makes most sense to view diversion potential as part of a comprehensive strategy rather than at the level of the facility.

Table 48. Facility Risk Assessment Matrix

Facility	Cost	Cultural Barriers	Political Barriers	Environmental Justice	Likelihood Of Success
WTE	High	Medium	Medium	High	Medium/Low
Landfills	Medium	High	High	High	Low
SS RMPF	Low	Low	Low	Low	High
Dry MRF	Low	Medium	Low	Medium	Medium
Compost / Mulch	Low	Medium	Medium	Low	High
Pyrolysis	Low	Medium	Medium	Low	Medium
ADs	Medium	Medium	Medium	Low	Medium
MWP	High	Medium	High	High	Low
C&D Processing Facility	Medium	Low	Medium	Medium	Medium
Drop-Off Centers: Textiles, HHW & Electronics	Low	Low	Low	Low	High

9.2 WASTE-TO-ENERGY

- **Costs: High**
  - Building and maintaining WTE facilities requires significant reoccurring capital investments, as well as ongoing operational costs. Costs are also high due to additional air quality control systems required to meet permit standards, as well as disposal of ash residue at a landfill/monofill, and heavy usage of consumables (i.e., lime, activated carbon, urea, etc.) needed to process solid waste at a WTE facility.
- **Cultural Barriers: Medium**
  - Floridians show moderate to high resistance to new WTE projects. After a fire that burned down the Dade Covanta facility in Miami-Dade County, environmental groups and residents have been actively opposing the replacement of a $1.5 billion WTE facility.[47] Not-In-My-Backyard (NIMBY) concerns are also the case for any new development projects for WTE.
- **Political Factors: Medium**
  - WTE systems receive mixed political support. In Broward County, the high cost of land makes WTE an appealing option due to its ability to significantly reduce municipal solid waste (MSW) tonnage through metals recovery and the residual ash, which

[47] https://www.theguardian.com/us-news/2024/sep/30/florida-airport-trash-incinerator-plant

requires far less space compared to traditional landfills. While some policymakers advocate for WTE as a practical alternative to space-intensive landfills, others express opposition due to environmental justice concerns.

- **Environmental Justice: High**

  - WTE facilities may raise environmental justice concerns, dependent upon the proximity to population centers; therefore, WTE is given a high rating. Historically, WTE facilities were successfully permitted based on stringent air emissions limits and utilizing robust and state-of-the-art air pollution control technologies, however, pollution from these facilities is still a perceived environmental and public health concern. Particulate matters, Sulfur oxides (SOx), Nitrogen Oxides (NOx) pollutants are linked to respiratory issues such as asthma and as such, they are scrutinized by permitting agencies. These emissions concerns are mitigated through selective catalytic reduction (SCR) systems, scrubbers, filters, and other state-of-the-art advanced and emerging technologies.

- **Likelihood of Success: Medium/Low**

  - WTE is one of the main methods of MSW disposal in Broward County. Given the existing infrastructure, the likelihood of continued success in Broward County is Medium. Ensuring the existing facility maintains permits, Best Available Control Technology (BACT), transparent reporting, continued education and outreach, and facility monitoring will be critical to WTE operations.

  - The probability of successfully establishing a new WTE facility in Broward County is medium/low, given the significant challenges related to land scarcity, public opposition, and environmental considerations outlined above.

9.3 LANDFILLS

- **Costs: Medium**

  - While landfills generally have lower capital and operational costs compared to WTE facilities, the most significant financial challenge is related to siting. The scarcity of suitable land and the high cost of property in Broward County create substantial barriers.

- **Cultural Barriers: High**

  - Public opposition to new landfills in Florida is significant, driven by Not-In-My-Backyard (NIMBY) concerns. Common objections include issues related to odors, reduced property values, and perceived environmental impacts.

- **Political Factors: High**

  - Political resistance to landfills and reliance on landfill-based waste management is considerable. Geographically, Florida's high groundwater tables and flood-prone regions exacerbate the challenge of preventing groundwater contamination, making the siting and operation of landfills more difficult.

- **Environmental Justice: High**

  - Landfills raise substantial environmental justice issues due to their association with air and groundwater pollution, diminished property values, and contributions to climate change. Methane emissions from landfills, which are far more potent as a greenhouse gas than carbon dioxide, further diminish their standing compared to WTE, which ranks higher on the U.S. EPA's waste management hierarchy. WTE is given a high rating for environmental justice due to these concerns.

- **Likelihood of Success: Low**

  - The probability of successfully establishing new landfills in Florida is low, given the significant challenges related to land scarcity, public opposition, and environmental considerations outlined above.

9.4 SINGLE-STREAM RMPF

- **Costs: Low**

  - Net cost per ton of processing recyclables at a single stream RMPF typically is cheaper than WTE and landfill disposal options. Please see net processing costs per ton in **Table 19**.

- **Cultural Barriers: Low**

  - SSR is convenient and easier to participate in compared to DS recycling. Because SS requires only one (1) container vs. multiple that DS recycling requires, residents typically favor this system.

- **Political Factors: Low**

  - SSR facilities tend to have political support as they divert materials from WTE and landfills. Some communities in Broward County have suspended SSR due to increased costs over the years, causing additional political pressures.

- **Environmental Justice: Low**

  - Because SSR diverts materials away from landfills and WTE facilities, environmentally this system is preferred compared to disposal of materials and siting of additional disposal facilities

- **Likelihood of Success: High**

  - Historically and presently, SSR has a high likelihood of success. Continued education and outreach is essential to bringing awareness to the public on the benefits of recycling.

9.5 DRY MRF

- **Costs: Low**
  - The net cost per ton of processing recyclables at a SS RMPF is typically lower than the cost of WTE and landfill disposal options, but higher than the cost of SS RMPFs where recyclables are source-separated at the point of disposal. Please see net processing costs per ton in **Table 19**.
- **Cultural Barriers: Medium**
  - Dry MRFs are convenient and easier to participate in than SSR. However, there may be some barriers to Dry MRFs due to the lack of familiarity with the system compared to SSR.
- **Political Factors: Low**
  - Dry MRF facilities tend to have political support as they divert materials from WTE and landfills. Some communities in Broward County have suspended SSR due to increased costs over the years, causing additional political pressures.
- **Environmental Justice: Medium**
  - Because Dry MRFs divert materials away from landfills and WTE facilities, environmentally this system is preferred compared to disposal of materials and siting of additional disposal facilities. Dry MRFs however, have a higher residue and contamination rate. Compared to a SSR MRF, a dry MRF would capture less materials.
- **Likelihood of Success: High**
  - A Dry MRF has a high likelihood of success as technology continues to improve. For example, most new SSR MRFs with significant processing capacity are designing to manage up to 30% inbound contamination levels and similar technology is being deployed in Dry MRFs. Continued education and outreach are essential to bringing awareness to the public on the benefits of recycling.

9.6 COMPOST/MULCH

- **Costs: Low**
  - Composting and mulch facilities have lower initial costs and processing costs than WTE facilities and landfills. Please see **Table 19** for additional information on capital costs, operating costs, and net cost per ton processed.
- **Cultural Barriers: Medium**
  - The cultural barrier to composting facilities is medium. Not-In-My-Backyard (NIMBY) concerns and residents' concerns about odors from composting facilities contribute to cultural barriers being rated as a medium. CASP system and proper management

of facilities can prevent odors. Resident education is important to facilitate the siting process.

- **Political or Geographic Barriers: Medium**

  – The warm climate of Florida makes it ideal for composting, as it accelerates the breakdown of organic material. However, fibrous yard trimmings may pose a challenge. The biggest political barrier potentially to compost facilities may be NIMBY concerns and/or finding suitable land for development. The large footprint also makes siting challenging.

- **Environmental Justice: Low**

  – Environmental justice concerns are typically low for composting facilities as it supports diverting materials away from landfills and WTE facilities. Some environmental concerns include dust, noise, and potentially odors. Depending on the distance of the compost facility, the net greenhouse gas emissions benefit may favor WTE due to fugitive emissions. The large scale of the operation increases the risk of mismanagement and increased odor or emissions. NIMBY issues may be present regarding siting facilities.

- **Likelihood of Success: High**

  – Compost/mulch facilities are likely to succeed due to the relatively moderate barriers. End markets for materials may present a challenge where a skilled and creative salesforce and biochar may mitigate risk. A strong education and outreach program, controlling odors and pests (e.g., birds), and ensuring the finished compost finds an end market will be critical to its success.

9.7 PYROLYSIS

- **Costs: Low**

  – Pyrolysis initial and operating costs compared to WTE facilities and landfills costs is the reason for the low-cost rating. However, low process capacity makes this a complementary solution rather than a primary solution. Please see **Table 19** for additional information on capital costs, operating costs, and net cost per ton processed.

- **Cultural Barriers: Medium**

  – As a relatively new technology to the general public, the cultural barrier is medium. Resident education is important to facilitate the siting process and to distinguish it from other forms of pyrolysis/gasification technology.

- **Political or Geographic Barriers: Medium**

  – Political attitudes toward pyrolysis to create biochar are currently positive. However, as an emerging waste management technology there is some risk of emerging regulations.

- **Environmental Justice: Low**

  - Environmental justice concerns are typically low for yard waste management facilities as it supports diverting materials away from landfills and WTE facilities. Carbon sequestration provides environmental benefits as does the potential for mitigation of microplastics, PFAS or other contaminants. Emerging understandings of fugitive emissions may introduce risk. NIMBY issues may be present regarding facility siting which can be overcome by education.

- **Likelihood of Success: Medium**

  - As an emerging technology in waste management, there is some risk. Market outlook for end products as well as the upside for the sale of attributes/offsets is bullish but may experience volatility in the long term.

9.8 ANAEROBIC DIGESTERS

- **Costs: Medium**

  - ADs are rated medium for costs. Please see **Table 19** for additional information on capital costs, operating costs, and the net cost per ton processed.

- **Cultural Barriers: Medium**

  - The cultural barrier for ADs is medium due to the lack of familiarity of residents with the technology. NIMBY concerns due to lack of familiarity with the technology may be present. Resident education and understanding of the technology can assist with alleviating these concerns and is important to facilitate the siting process.

- **Political or Geographic Barriers: Medium**

  - The small footprint and enclosed nature of AD systems results in low political/geographic barrier rating. Political risk related to the Federal Renewable Fuel Standard program, or the state Low Carbon Fuel Standard program, may impact upside potential.

- **Environmental Justice: Low**

  - Environmental justice concerns are typically low for composting facilities as it supports diverting materials away from landfills and WTE facilities. Some environmental concerns include dust, noise, and potentially odors. Depending on the distance of the compost facility, the net greenhouse gas emissions benefit may favor WTE due to fugitive emissions from compost piles. NIMBY issues may be present with regard to siting facilities.

- **Likelihood of Success: Medium**

  - Large scale AD facilities for source separated municipal solid waste organics is an emerging technology with existing U.S. implementations having to overcome some initial challenges. Current RNG incentives provide significant upside potential but

may be subject to political or market risks. Digestate management and PFAS concerns must also be considered.

9.9 MIXED WASTE PROCESSING FACILITY

- **Costs: High**
  - MWP Facilities require significant capital and operational costs due to specialized technology for sorting mixed waste. Contamination and the mixed nature of materials coming in require additional processing and/or disposal costs.
- **Cultural Barriers: Medium**
  - MWP facilities may provide convenience and reduce the burden on the public to sort waste. There is, however, moderate public opposition due to potential pollution, odors, and costs. As with any solid waste facility, MWPFs also face NIMBY concerns.
- **Political or Geographic Barriers: High**
  - Political barriers for MWPFs can be high, due to high costs and the reduced quality of recyclable output. There is also little awareness of MWPFs from the general public. In addition, there are examples of several failed facilities with investments lost. MWPFs are P3 in most cases so public funds must be leveraged. Flow control is typically necessary to ensure recovery of cap-ex.
- **Environmental Justice: High**
  - Environmental justice concerns are high due to potential air quality, noise, and odor. Low recovery rate compared to cleaner streams (i.e., those that don't have organics mixed with solid waste).
- **Likelihood of Success: Low**
  - The likelihood of success of MWPF is low to moderate given the significantly high costs, lack of awareness, and associated cultural and political barriers.

9.10 C&D PROCESSING FACILITY

- **Costs: Medium**
  - C&D recycling facilities have moderate capital and operational costs compared to WTE facilities. C&D Recycling facilities also require less land compared to C&D landfill capacities for processing. Capital costs may be more than projected if C&D must be done in a fully enclosed building. Similarly, but on the positive side, C&D is a complementary land use to yard waste recovery, and siting adjacent facilities saves transportation costs for clean wood to be processed. C&D recycling facilities are able to generate a small amount of offset revenues through recovery of materials. C&D facilities typically have less state-reportable diversion than WTE (50%).

- **Cultural Barriers: Low**

  - As with any solid waste facility, C&D recycling facilities also face NIMBY concerns. However, with growing support for green buildings (e.g., LEED and other certifications), the continued growth of new construction and remodeling of residential units will help offset neighbors' concerns.

- **Political or Geographic Barriers: Medium**

  - Political barriers for C&D facilities are low to moderate. Siting any new solid waste facility is challenging in urban southern Florida, especially in Broward and Miami-Dade County. However, C&D facilities can help provide assets needed during a large storm event.

- **Environmental Justice: Medium**

  - Environmental justice concerns are moderate given dust and noise. In addition, C&D sites must be monitored for arsenic and strychnine from pressurized lumber and vegetative debris, hydrogen sulfide (H2S) health alert and odor emissions from drywall, and stormwater quality before release. In the future, PFAS/PFOE issues from crushing and sizing materials may also be a challenge.

- **Likelihood of Success: Medium**

  - The likelihood of success of a new C&D facility is moderate given the existing C&D processing infrastructure in the region.

9.11 DROP-OFF CENTERS: HHW & ELECTRONICS, TEXTILES, RECYCLING

- **Costs: Low**

  - Capital Costs for Drop-Off Centers for HHW, electronics, textiles, and recycling are low. Operating costs depend on the level of staffing required and the cost recovery model used.

- **Cultural Barriers: Low**

  - There are low cultural barriers associated with additional drop-off centers. Increasing convenience of safe disposal options for special waste will likely be favored by the community.

- **Political or Geographic Barriers: Low**

  - Political barriers to increasing drop-off access are low for the same reason as cultural barriers.

- **Environmental Justice: Low**

  - There are very little environmental justice concerns for increasing drop-off centers for the same reasons as cultural barriers. Increasing access is a benefit to residents and communities.

- **Likelihood of Success: High**

  - The likelihood of success of drop-off centers is high given the low cultural, political, and environmental justice barriers. Broward County currently has five (5) drop-off centers in operation, serving 1.98 million residents. Increasing access will be seen as a positive step for recovery.

10.0 TECHNOLOGY ALTERNATIVES

Technological alternatives and innovative solutions are essential to effectively manage the growing volume of waste, evolving consumption patterns, labor shortages, and environmental concerns. Key technological needs include specific solid waste apps for users, enabling feedback loops from the waste system to residents, collection trucks, and contractors. These apps can help improve process efficiency and contamination reduction. Additionally, collector apps that facilitate precise customer service (e.g., retrieving full containers) and support real-time tracking of data collection, compilation, and storage are crucial for providing system feedback focused on reducing contamination and enhancing supply chain efficiency.

Technological innovations are transforming waste collection and hauling through the integration of smart systems, automation, and sustainability-driven designs. IoT-enabled sensors in bins and AI-powered scheduling systems optimize routes and reduce operational costs, while autonomous and electric vehicles reduce emissions and noise pollution. Furthermore, new systems designed to incentivize and educate system users about waste reduction and responsible consumer behavior will require significant investment. These advancements streamline operations and help municipalities meet their environmental goals.

Recycling technologies are also advancing, utilizing optical sorters, AI, and robotics to enhance sorting accuracy and reduce contamination in recyclables. Digital platforms improve transparency and efficiency through blockchain and GPS tracking, while data analytics provide valuable insights for refining waste management policies and optimizing routing and transfer operations. These technologies all focus on better resource recovery and facilitating the transition to a circular economy.

Table 49 presents a cross-section of key innovative technologies paired with the scenarios discussed in this Task 4 White Paper. For a more detailed discussion of these technologies, please refer to the Task 9 White Paper.

Table 49. Key Innovative Technologies by Scenario

Scenario	Interactive Community &/or Authority-wide Waste Services Portal	Smart Waste Management Apps	Smart Multi-Family Collection Tools	Advanced MWP	Biochar	AI/RFID Monitoring of Cart Images During Dumping / Enforcement
A	X	X	X		X	X
B	X	X	X		X	X
C	X	X	X		X	X
D	X	X	X	X	X	X
E	X	X	X	X	X	X

Appendix A

Review of Single-Stream Vs. Dual-Stream Recycling

Current Residential Recycling System

In 2009, Broward County transitioned from a DS recycling collection system to a SS system, with the rollout of cart-based collection programs for SS recyclables commencing in 2011. Among the County's 31 municipalities, 26 currently operate single-family residential curbside recycling programs. These programs utilize a once-weekly, containerized, SS collection system.

However, five (5) municipalities, Coconut Creek, Deerfield Beach, Margate, Davie, and Pembroke Pines, have suspended or terminated their curbside recycling programs. In these areas, recyclables are now collected with regular garbage and directed to WTE facilities. The reasons cited for discontinuing curbside services include declining recycling market conditions, high contamination rates, and significant increases in collection and processing costs driven by the area's sole service provider. For example, Coconut Creek reported a dramatic financial impact. While the recycling program previously generated $40,000 in annual revenue, by the time of its suspension, it was costing the city more than $200,000 annually. Additionally, approximately one-third of the collected recyclables were being sent to landfills due to contamination.

A limited number of lower-density multifamily residences are included in these municipal curbside collection programs. For larger multifamily units and homeowner associations, recycling services are available through private providers on an opt-in basis. Despite some legislative frameworks being in place, mandatory recycling collection is not enforced. Relevant laws and regulations can be referenced in **Table 50**.

Table 50. Laws Governing Multifamily Recycling Services in Broward County

Municipality	Website Instructions	Mandatory or Voluntary
Pompano Beach	Residential collection includes duplex and tri-plex properties. "Residents of condominiums and multi-family neighborhoods should check with their homeowners' association or property manager for their particular recycling rules."	Voluntary[48]
Broward County	"Residents of multifamily communities (condos, apartments) in Broward County are encouraged to recycle. SSR makes that easy because you can put recyclable items together in the same container. There's no need to sort. If recycling isn't available where you live, watch our new multifamily recycling video, then talk to	Voluntary. Mandatory only for the unincorporated areas of

[48] https://www.pompanobeachfl.gov/government/solid-waste-and-recycling/recycling-program#:~:text=Participation%20in%20a%20recycling%20program,Coordinator%20by%20phone%20at%20954.545.

Municipality	Website Instructions	Mandatory or Voluntary
	your property manager or HOA about getting a program started.	Broward County [49]
Ft. Lauderdale	Duplex, tri-plex, and cottages on properties are included. "If your property offers SSR you can mix all of your recyclables together, but if not, then you will have to separate paper from other recyclables." Many buildings offer SSR at this time. • If your recycling is sent down a chute system, you may have difficulty fitting certain larger recyclables, such as cardboard boxes. Please check with building or property management to determine where they should be placed. • Because your recycling bins are shared, they will become full very quickly. Please separate caps and lids so that you can crush the air out of plastic and paper containers. This saves space in the dumpster and in the truck. • Please also be respectful of your neighbors who live near the container. Keep your recycling clean. Rinse plastic, glass, and metal recyclables. And remember, no food in the recycling containers please!"	Voluntary. Mandatory only for Multifamily[50]
Plantation	"… Plantation requires all non-multifamily residents, single-family homes, townhouses, duplexes and triplexes (other than those located in Plantation Acres or Melaleuca Isles) to use Plantation's clear recycling bags for their solid waste recycling."	Voluntary[51]

Recyclable materials collected by each member municipality are either consolidated prior to being transported to the Reuter Facility or delivered by SS collection trucks. Authority members have various contracts with private companies for the collection and transfer of materials for processing and marketing of the materials. Approximately 240,000 TPY are collected and processed at the 800 TPD Reuter Facility as reflected in **Table 51**.

[49] https://library.municode.com/fl/broward_county/codes/code_of_ordinances?nodeId=PTIICOOR_CH14GATR
[50] https://gyr.fortlauderdale.gov/home/showpublisheddocument/5721/635507713464070000
[51] https://www.plantation.org/government/departments/public-works/recycling-guidelines

Table 51. Single-Stream Recycling Tons received by WM Reuter Facility

Facility Name	Facility Type	Address	City	SSR (Tons)
WM Reuter Facility	RMPF - Class I & III	20701 Pembroke Road	Pembroke Pines	800 TPD (~240,000 TPY)

Correspondingly, the recycling hauler and percent of SSR received from residential curbside recycling programs of each municipality in Broward County are presented in **Table 52**.

Table 52. Residential Curbside Recycling Programs by Municipality

Municipality	Recycling Hauler	SSR % of tons received[52]
Coconut Creek **Recycling suspended**	Republic Services	2%
Cooper City	Coastal	0%
Coral Springs	Coastal	3%
Dania Beach	Waste Management	11%
Davie **Recycling suspended**	Coastal	3%
Deerfield Beach **Recycling suspended**	Deerfield Beach	0%
Fort Lauderdale	Waste Management	0%
Hillsboro Beach	Waste Pro	7%
Hollywood	Waste Pro	0%
Lauderdale-By-The-Sea	Waste Pro	12%
Lauderdale Lakes	Waste Management	2%
Lauderhill	Waste Management	0%
Lazy Lake	Waste Management	5%
Lighthouse Point	Waste Management	0%
Margate **Recycling suspended**	Republic Services	1%
Miramar	Waste Pro	0%
North Lauderdale	Waste Management	12%
Oakland Park	Oakland Park	4%
Parkland	Waste Management	4%
Pembroke Park **Recycling suspended**	Waste Management	4%
Plantation	Waste Management	0%
Sea Ranch Lakes	Waste Management	8%
Southwest Ranches	Waste Management	0%

[52] Based on Task 2 Mass Balance SSR (for year 2023)

Municipality	Recycling Hauler	SSR % of tons received[52]
Sunrise	Republic Services	1%
Tamarac	Waste Management	8%
West Park	Waste Pro	6%
Weston	Republic Services	1%
Wilton Manors	Coastal	6%
	Total	100%

Overview of Single-Stream Collection and Processing Systems

There are two (2) main types of curbside recycling collection programs operating in the United States today, namely, SS and DS collection systems.

SSR is a system in which all recyclables, including newspaper, cardboard, junk mail, paper packaging, plastic packaging, aluminum and steel packaging, etc., are placed in a single container for recycling. These recyclables are collected by a single truck and taken to a RMPF to be sorted into various commodity streams for sale to end markets which can be used for re-manufacturing in useful products.

SS programs may utilize the same mobile collection equipment as containerized solid waste and containerized yard waste, usually an automated side loader or a semi-automated (cart flippers) rear load vehicle. The compactor trucks that collect the recyclables typically have one (1) compaction compartment.

SS offers several benefits that simplify the recycling collection process but may result in additional costs further down the supply chain. Key advantages and disadvantages are summarized in **Table 53**.

Table 53. Advantages and Disadvantages of Single-Stream Recycling

SS Advantages	SS Disadvantages

• **Payload**
  ○ Trucks utilizing a single compaction container body can maximize compaction storage versus DS collection. In modern trucks the collection capacity for SS is up to 15-tons per load. Having more than one (1) compaction body on a truck for DS means the split bodies will fill up at different rates with the one that fills fastest dictating productive time on routes.
• **Stop Time**
  ○ Less time is spent for each collection stop, and service time per household is
	• **Contamination**
	  ○ SSR collection may underperform in terms of quality when compared to its counterpart, DSR. Mixing materials often crushes them during collection, making them harder to recover.
	  ○ While SS may be perceived to have higher participation rates and higher contamination rates as compared to DS, studies are largely inconclusive as other factors such as outreach and education, frequency of collection, as well as container types may also impact performance.

SS Advantages	SS Disadvantages
reduced by at least 50% because only one (1) container needs to be loaded into the truck and the action does not need to be repeated as in DS or multi-stream. • **Automation** ○ With the advent of automated cart collection, a dangerous job of manually dumping recyclables, and repeating that process twice at each stop for DS collection (whether manual or split body truck) vs. one (1) dump of recyclables in a large container for SS (usually 48-gallon, 64-gallon, or 96-gallon containers). • **Route Cost per Household** ○ Maximum households per route day and truck body utilization (see **Table 47**) • **Lower Collection Operating Costs** ○ In addition to the aforementioned efficiencies, SSR typically requires a fewer number of trucks and staff since only one (1) recycling container needs to be collected, rather than multiple in a DS system. As such, overall operating costs of the collection system, including labor, vehicle maintenance, fuel, and containers, are reduced.	• **Reduced Quality of Recyclables** ○ Paper pierced with glass and aluminum and plastic cans crushed together must be diverted to landfills. Because it requires more attentive separation from consumers, DSR generally has less contamination, meaning purer materials, less contamination, and higher prices. • **Higher Processing Costs** ○ Due to higher contamination rates within SS operations, there tends to be higher sorting and processing costs at RMPF. Typically, additional time, workers, or sorting technologies are required to remove contaminants, consequently, higher costs.

Overview of DS Collection and Processing Systems

Under the DS system, residents usually combine all their food and beverage containers (aluminum and steel cans, glass jars and bottles, and some or all plastic bottles) in one (1) bin, and they put their newspapers and/or mixed paper (such as junk mail, cereal boxes, and home office paper) in another bin, or in a brown paper grocery bag.

The two material streams are picked up and placed in separate compartments on the recycling truck and taken to a RMPF. The fiber is sent to market with little or no processing, and the containers go through a variety of automated sorting equipment and hand-picking before being baled or containerized and sent to market.

The DS system generally offers the converse benefits and drawbacks from the SSR process. Key advantages and disadvantages are summarized in **Table 54**.

Table 54. Advantages and Disadvantages of Dual-Stream Recycling

DS Advantages	DS Disadvantages

• **Reduced Technical and Financial Barriers for Recycling Facilities**
  ○ Given the materials are pre-sorted, facilities are less complicated and may not require additional workers or sorting technologies to separate materials.
• **Less Contamination**
  ○ DS recycling tends to have less contamination of materials. Higher quality recyclables are favored by RMPFs and end markets, which makes the business more attractive for operators. To reduce contamination of recyclables, California amended their code in 2020 (through AB815) to encourage municipalities to switch from SSR to DSR.
• **Lower Processing Costs**
  ○ Because materials are sorted at the source, processing costs may be lower than SSR. In one case in New Jersey, the cost of processing materials from DS collection was found to be $40 per ton less to process compared to SSR. A higher quality of recyclables means RMPFs can sell bales to end markets at a higher financial value, leading to potentially higher profits for facilities.
	• **Inconvenience**
	  ○ Because generators are asked to source-separate recyclables into multiple bins, more effort is required from consumers. This added inconvenience can lead to lower participation rates. For those who find the process too complicated, it could lead to some not participating in recycling at all.
	• **Space Limitations**
	  ○ DS recycling requires multiple containers, taking a larger container footprint. For urban and dense communities, space limitations for additional containers are a concern for residents and businesses. If additional streams are looking to be added, resulting in another container (e.g., yard waste collection or food waste collection), the limited footprint becomes increasingly important.
	• **Increased Vehicular Traffic**
	  ○ With additional trucks required for collections, there is increased greenhouse gas emissions from trucks, a concern for communities focused on climate and emission goals. Additional trucks will also mean greater wear and tear on the roads and increased vehicular traffic.
	• **Higher Collection Costs**
	  ○ Collection costs tend to be significantly higher in a DSR system. DS requires multiple trucks to collect the two (2) streams or split-body trucks with a 60/40 split, which tend to be more expensive. With multiple trucks, additional resources for collections are required including staffing, vehicle maintenance, and containers.
	• **Increased Outreach Costs**
	  ○ To combat contamination and getting materials in the right container, municipalities may spend additional funding on outreach resources (campaigns, container labels, mailers, cart tags, etc.).

Summary Comparison of Single and DS Collection

Table 55 compares the impacts of different characteristics for SSR and DSR programs on municipal operations, costs, processing revenues and residents.

Table 55. Overall Considerations of Single vs Dual-Stream Recycling

Overall Considerations	Characteristic	Collection Method	
		SS	DS
Operations	Staffing	2- Driver and collectors	1 FTE- Automated, driver 2 FTE- Rear Loader with Flipper- 2- Driver and collectors
	Equipment	Materials mixed in one (1) truck	Paper and commingled materials in separate trucks, or one (1) specialized split-body truck
	Pace/Speed	Fast	Fast/medium
	Households per Route Day	900-1200 avg. Saves from 20-45% of a route vs. DS	650-800
	Automated vs. Manual Collection	Automated, but some manual	Two (2) manual automated dumps per household or two (2) separate drive-bys per household per week.
Cost	Collection Cost based on $925/rt./day (varies between $650 and $1,200 per day per route NOT INCLUDING PROFIT)	$.88/HH/WK	$1.27/HH/WK.
	Contamination Cost	10-40%	5-15%
	Processing cost (HH cost based on avg. 280#/HH/yr. ranges from 150-500# based on community)	$100-120 per ton (including disposal costs from contamination) $14 to $16.80/HH/yr.	$50-85 per ton including disposal $7 to $11.20/HH per year
Processing Revenues	Material Commodity	Most SS programs generate more volume due to more participation due to convenience.	Higher quality bales with lower contamination
Residents	Convenience	High	Medium

DS Case Studies

Palm Beach County, FL

Palm Beach County is the largest county by total land area and 4th largest in population in Florida, with approximately 1.5 million residents. Palm Beach County stands out as a DS proponent within the state, with the City of Lake Worth Beach (Lake Worth) even converting back from SS to DS operations citing cost savings of almost $200,000 a year[53]. In recent years, Palm Beach County has the highest recycling rate in the State standing at 80% and 84% in 2022 and 2023 respectively.[54 & 55] This ranking however, is based on the adjusted recycling rate where per Chapter 403.706(4)(a) F.A.C., each megawatt-hour produced by a renewable energy facility using solid waste as a fuel shall count as one (1) ton of recycled material. For comparison, as summarized in **Table 56**, data from the Florida DEP for FY2020 shows a relatively smaller (% vs. %) discrepancy in terms of the unadjusted County Recycling Rate by means other than renewable energy.[56 & 57]

Table 56. County Recycling Rate With and Without Renewable Energy

	Broward County	Palm Beach County
Unadjusted County Recycling Rate by means other than renewable energy	30.94%	46.58%
Unadjusted County Recycling Rate (including renewable energy)	42.04%	74.41%

Materials Collected

In Palm Beach County, yellow containers are utilized to collect fiber and blue containers are used to collect commingled items.[58] **Table 57** presents the list of items accepted for each category of items.

[53] https://www.wastedive.com/news/dual-stream-recycling-wilkes-barre-lake-worth-beach/611493/; https://www.wastedive.com/news/lake-worth-florida-dual-stream-collection/531504/
[54] https://floridadep.gov/waste/waste-reduction/documents/2023-total-county-recycling-credits
[55] FLDEP 62-716.480 Methods and Criteria for Calculating County Recycling Rates: total amount of municipal solid waste generated within its boundaries that is recycled, divided by the total amount of municipal solid waste generated within its boundaries that is recycled, land disposed, or combusted.
[56] https://floridadep.gov/sites/default/files/Broward_2020.pdf
[57] https://floridadep.gov/sites/default/files/Palm_Beach_2.pdf
[58] https://swa.org/192/Recycling-at-Home

Table 57. Items Accepted for Recycling in Palm Beach County

	Accepted Fibers	Accepted Commingled
Items Accepted	• Cardboard • Newspapers and inserts • Dry Food and Pizza Boxes (no food stains) • Mixed Paper • Cardboard Paper Rolls • Mail • Magazines • Paper Bags	• Plastic bottles and containers – lids on; 2 gallons or less • Food and beverage cans • Glass bottles and jars (lids off) • Milk and juice cartons (lids on) • Drink boxes (no pouches, no straws) • Mixed Bulky Rigid Plastics

Collection Infrastructure

Palm Beach County Solid Waste Authority (SWA) offers wheeled carts for multifamily and condominium complexes with dumpster service. Wheeled carts for multifamily complexes are collected mechanically.

For residential recycling services, SWA provides blue and yellow recycling bins for curbside customers. For blue recycling containers, residents have a choice of an 18-gallon or 25-gallon bin. Residents living in certain areas are offered a 35-gallon wheeled recycling cart. Yellow recycling bins, which are used to collect fiber, are offered only in an 18-gallon bin. Materials are collected in a split body 40/60 truck manually for bins. Recycling bins are provided to residents at no charge.

Additionally, SWA provides free waste reviews for businesses to assess garbage and recycling needs. Fees are associated with implementing commercial recycling, however, the SWA shares that these costs may be offset by a reduction in garbage fee.

Processing (Sorting) Infrastructure

Materials are consolidated into one (1) of six (6) transfer stations, strategically placed to consolidate waste in the county to transport to the Renewable Energy Park (two (2) WTE, chemical recycling center, class I landfill, class III landfill, biosolids facility, and recovered materials processing facility). Materials are collected in tractor trailers from the transfer stations and brought to the SWA's Recovered Materials Processing Facility (RMPF).

The RMPF was originally established on a 35-acre site located in West Palm Beach, Florida. The 138,000 square foot facility is comprised of an Administration Area, an Education Center, a 30-ton-per-hour Residual Fiber System, a 15-ton-per-hour commercial fiber system, a 15-ton-per-hour commingled container system, and supporting maintenance shop and storage areas. The facility has a processing capacity of approximately 900 tons per day, with three (3) tip floors feeding three (3) processing systems.

The RMPF facility is split into two (2) areas, "yellow bin side" and the "blue bin side," separating the fibers from the commingled items.

On the “yellow bin side” paper and mixed cardboard is tipped out of vehicles. Tractor trailers from transfer stations unload onto the tip floor using a walking floor mechanism, which pushes the materials out rather than tipping the materials. Split body trucks collecting in closer proximity to the facility are directly tipped onto the tip floor. When cardboard alone is present in collection vehicles, they are dumped in a separate pile on the tip floor from the mixed paper pile.

A loader then collects materials and loads it onto the conveyor belt and takes it to a negative sort. Workers then remove any visible contaminants (e.g., plastic film or wood). Star screens separate mixed paper from cardboard before going through a negative sort, where workers pull additional materials that do not belong. Materials are then taken to a trommel and particulates removed.

The remaining materials move up a conveyor belt, then a loader moves the sorted materials to silos before they are ready for the baler. Three (3) different paper products, regular, premium, and cardboard. Bales are stored inside the facility to prevent moisture and protect from the rain.

On the “blue bin side” or the “container” side of the RMPF, plastics, metals, glass, and cartons are tipped on to the tipping floor. A loader picks up the materials from the tip floor onto a conveyor belt and magnets pick up steel cans.

Workers pick out any contaminants in a negative sort before the materials move into a glass crusher. Glass shatters and falls through into a separate silo, these materials are used in road cover. An eddy current picks up aluminum for separation.

Remaining items are cartons and plastics, which are further separated through optical sorters. #1PET, natural #2 HDPE, and colored #2 HDPE, and mixed plastics are separated and baled. Plastic bales are stored outside and eventually sold to a recycler for new material.

Participation Rates & Contamination Rates

The FDEP[59] released an annual report on participation rates of recycling across single-family, multifamily, and commercial populations.

Palm Beach County, with a population of 1.5 million residents, has 314,000 single-family units in the county with approximately four (4) residents per unit. Fifty percent of the units participate in service, representing 41% of the total population participating in recycling.

For multi-family, 50% of the units, approximately 185,000 out of 370,000 participate in recycling. Sixty percent of the commercial units representing nearly 19,000 entities participate in the County.

For all sectors, there is recycling access for 100% of the county’s single-family, multifamily, and commercial generators. **Table 58** summarizes the recycling participation rates of Palm Beach County.

[59] https://floridadep.gov/waste/waste-reduction/content/2023-solid-waste-management-report

Table 58. Recycling Participation Rates in Palm Beach County

	Single-Family	Multi-Family	Commercial
Number of Units	314,187	369,936	31,184
Residents per Unit	4	2	N/A
% Total Units with Service Available	100%	100%	100%
# Units Participating in Service	157,094	184,968	18,710
% of Units Participating in Service	50%	50%	60%
% Total Population Participating in Service	41%	24%	N/A

The SWA of Palm Beach County notes that the County contamination rate is between 8-9%,[60] pointing to low contamination rates to a DSR system.

Montgomery County, MD

Montgomery County, Maryland is another example of a DSR system. The Maryland Recycling Act (MRA) outlines the types of waste that are credited toward a county's recycling rate. Montgomery County, Maryland is required to meet a mandatory recycling rate of 35%.

In CY 22, Montgomery County achieved a 39.76% MRA rate, which is calculated with the following formula: MRA Recycling Rate = (MRA recycling tonnage + RRF credit tonnage) ÷ (MRA recycling tonnage + MRA waste tonnage) x 100.[61]

Recycling rates are calculated with credit from Resource Recovery Facilities (RRFs), which process waste to generate energy and recycle materials. The County's recycling rates without the RRF credit tonnages are not reported by the Maryland Department of Environment's annual Solid Waste Management and Diversion Report. Maryland calculates a separate waste diversion rate which also accounts for additional percentage points for source reduction. For comparisons with Broward County, the MRA County Recycling Rate which includes renewable energy are presented in **Table 59**.

Table 59. Recycling Rate Comparison, Adjusted for Renewable Energy

	Broward County	Montgomery County, MD
Unadjusted County Recycling Rate (including renewable energy)	42.04%	39.76%

[60] https://swa.org/FAQ.aspx?QID=237
[61] https://mde.maryland.gov/programs/land/Documents/Maryland%20Solid%20Waste%20Management%20and%20Diversion%20Report.pdf

Materials Collected

Montgomery County accepts mixed paper and cardboard in a blue recycling wheeled cart, a paper bag, a cardboard box, or bundled with twine, as well as glass, plastic, and metal bottles, jars, cans, and containers in the blue recycling bin. A list of items accepted are presented in **Table 6060**.

Table 60. Items Accepted for Recycling in Montgomery County, MD

	Accepted Fibers	Accepted Commingled
Items Accepted	• Newspapers and inserts • Boxes (cardboard, cereal, juice and drink, pizza boxes, produce and fruit, shoe, snack and cookie, pasta) • Mixed Paper • Mail • Magazines • Aseptic Cartons, Tetra Packs • Egg Cartons • Paper cups • Ice cream containers and lids • Thermal paper • Non-food grade coated paper • Political or yard signs • Wrapping Paper • Paper Bags	• Foil wrap • Pie plates • Other aluminum food trays • All metal food, beverage, and pet food cans • Tins from cookies, popcorn and similar items • Aerosol cans from non-hazardous products • Glass bottles and jars • Plastic bottles (#1-7) • Plastic containers, tubs and lids, pails and buckets • Tupperware or Rubbermaid durable plastic containers and lids • Nursery and flowerpots • Plastic beverage cups

Collection Infrastructure

Montgomery County services residents living in single-family and townhouses with its DSR program. Materials are collected on a weekly basis in split body rear loader trucks equipped with lifters for carts. Collections are typically done with a driver and one (1) or two (2) helpers.

Processing (Sorting) Infrastructure

Montgomery County Recycling Center sits on approximately nine (9) acres of land and is a 57,000 square foot facility that processes the DSR materials. The facility is a P3, with Maryland Environmental Service (MES) as the facility operator. Currently this facility processes 130 to 150 tons per day. Over the years, the facility has added an addition to the tip floor to increase capacity and allow for additional commingled materials for processing.

Once the recyclables are collected from the split-body trucks, recyclables are dumped onto the tip floor, separating the mixed paper and cardboard in one (1) pile, and the commingled (glass, plastic, metals) in another pile. Front-end loaders load these materials onto a conveyor belt, taken to a pre-sort station where workers remove contaminated non-recyclable items.

Magnets remove ferrous metals, vibrating screen catches broken glass, trommel screens catches paper, broken bottles and other smaller items, and an air classifier pushes the aluminum and plastic with air currents. Workers further sort items in lines. Eddy current magnets capture aluminum, and blowers continue to separate materials further via air pressure.

Materials that are processed into separate material categories are stored in silos until they are baled. Glass is also separated by color by workers and sent to a processor. The remaining residue is compacted and taken to the transfer station near the RMPF for disposal.

Participation Rates and Contamination Rates

Montgomery County has a team of three (3) recycling contamination specialists who inspect the commingled and mixed paper recycling containers before they are collected to estimate contamination rates. This assessment also helps capture the participation rates for County residents. In two (2) of the county's 13 collection areas, the County found that approximately 52% of the houses have recycling containers set out for collection. Fourteen percent of the recycling containers set out were found to have contamination present and were rejected. The contamination specialists provide information and educate the residents on the materials considered contaminants to change behavior. They report that after visiting the same route one (1) and two (2) weeks after the initial inspection, the contamination is reduced due to this dedicated outreach.

RMPF Upgrades to Allow for Single-Stream

Following a Facility Condition Assessment, Montgomery County is working toward updating the RMPF between FY 24-27. The project will include new equipment to increase commingled processing capacity to 200 – 240 tons per day (TPD) from the current processing capacity of 130-150 TPD.

According to Montgomery County's Capital Improvement Plan project sheet: "A full upgrade of the existing recycling center complex"[62] - the majority of the system components have been deemed to have operated beyond their useful life and causing frequent downtime and high repair and maintenance costs. Project justification details that replacement parts are also increasingly difficult to source for some equipment.

The project aims to reduce operating costs, increase revenues from the sale of recyclables, and increase processing efficiency. Furthermore, the design and upgrades to the RMPF will be built to consider allowing for future addition of SS processing equipment within the facility to potentially receive recyclables from out-of-county, if expansion to a regional concept is supported to improve the recycling program's cost-benefit ratio.

The existing RMPF building will be modified to increase storage capacity for both incoming and baled material. The updates will allow the facility to have greater operation uptime (expected to reach 90% rather than the current 83%) and expected to produce a higher quality product, which would yield greater market values.

The facility upgrades will also include bringing glass to the beginning of the sorting line, a best practice adopted by many modern RMPFs in the country, which will reduce wear and tear on the equipment. Additional upgrades include improved sorting screens, optical sorting, high efficiency

[62] https://www.montgomerycountymd.gov/OMB/Resources/Files/omb/pdfs/fy25/cip_pdf/P802201.pdf

electric motors, and reduced reliance on labor for sorting. Montgomery County is also looking to upgrade the electrical capacity dependent on load needs following renovations.

Outagamie County, WI

Outagamie County, Wisconsin is an example of a SSR system. Together with Brown County and Winnebago County, Outagamie formed the Tri-County Partnership in 2001 to provide waste management services to the three (3) Northeast counties in Wisconsin. The Tri-County Single-Stream Recycling Facility, one of the largest publicly own and operated RMPFs in the country was operationalized in 2009 and is located in Appleton, a city in Outagamie County. In 2023, Outagamie County Recycling and Solid Waste was awarded for its Outstanding Social Media Campaign as part of the Solid Waste Association of North America (SWANA) Technical Divisions Awards (Recycle More Outagamie, 2010). These education efforts are cited as key to keeping contamination rates low.

Materials Collected

Outagamie County accepts paper, plastics, metals and glass in a blue recycling wheeled cart. A list of items accepted, and items not accepted are presented in **Table 61**.

Table 61. Items Accepted for Recycling in Outagamie, WI

	Accepted (Commingled)	Not Accepted
Items Accepted	• **Paper** ○ Cardboard & Paperboard (Food Boxes) – Must flatten and cut cardboard boxes to 2' X 2' or smaller. ○ Newspapers & Inserts ○ Office & School Paper ○ Envelopes, Junk Mail & Catalogs ○ Books & Magazines ○ Milk, Juice & Soup Cartons • **Plastics** ○ Household Bottles, Jars & Jugs ○ Dairy Containers & Lids ○ Produce, Bakery & Deli Containers • **Metal & Glass** ○ Aluminum Bottles & Cans ○ Steel & Tin Cans ○ Glass Food & Beverage Bottles & Jars	• **Paper** ○ No Paper Cups ○ No Shredded Paper ○ No Tissue Paper ○ No Pet Food Bags • **Plastics** ○ No Plastic Cups & Lids ○ No Plastic Bags, Wraps & Films ○ No Motor Oil (May be dropped off in resource recovery park) ○ No Styrofoam (May be dropped off in resource recovery park) • **Metal & Glass** ○ No Aerosol Cans ○ No Propane Tanks (drop off only in resource recovery park) ○ No Aluminum Pans or Foil ○ No Empty Paint Cans ○ No Scrap Metal (May be dropped off in resource recovery park) ○ No Metal Cookware (May be dropped off in resource recovery park) ○ No Mirrors ○ No Window Glass ○ No Ceramics & China ○ No Drinking Glassware

Collection Infrastructure

Outagamie County provides curbside recycling collection for approximately 66,000 households within the county, including all of Appleton and New London residents who live in single family, duplex, tri-plex and 4-plex units. By law, property owners of five (5) units or more must provide adequate recycling for their tenants.[63] Materials are collected on a fortnightly basis in rear loader trucks equipped with lifters for carts. The Tri-County recycling program cites the City of De Pere (Brown County) as an example of how SSRs use of "large poly recycling carts" allows for automated side-loaders to be used, reducing labor requirements.[64]

Processing (Sorting) Infrastructure

The Tri-County Single-Stream Recycling Facility received a SWANA Recycling Excellence Award in 2010. The equipment layout of the facility is one (1) football field long and three (3) stories high, within a 50,000 square-foot building. While it originally served 65 communities (200,000 households), processing almost 50,000 tons per year from the three (3) counties when it first started operations in 2009, it has since grown to serve most of Northeast Wisconsin as well as parts of Upper Michigan. As of 2021, the facility was reported to have the ability to process more than 100,000 tons of recyclables annually (Waste Advantage Magazine, 2021).

About 800,000 pounds of recyclables are dumped by trucks onto the tip floor daily. These are fed onto a metering bin that provides a consistent material flow into the system from the tip floor to the pre-sort area. Sorters (typically two (2) to four (4) workers) remove trash (particularly plastic bags that may damage equipment) and also large metals and large plastics, both of which are recycled.

Next, cardboard is removed from the material stream with the OCC Separator and other materials fall through to a patented Debris Roll Screen which separates glass from the stream. The removal of glass results in cleaner commodities and less wear and tear on subsequent processing equipment.

After cardboard and glass is removed, paper is further sorted into newspaper and mixed paper. This stream goes through a manual quality control post-sort process to ensure optimum marketability of the recovered commodities.

Aluminum, plastics, tin and steel are further sorted at the container sort line. Aluminum is sorted utilizing an Eddy Current separator and ferrous metals are separated by an Electro-Magnetic Separator. Optical sorting is used to separate PET bottles from other residuals. Manual quality checks are also used to increase material recovery. This minimizes the material that eventually ends up as residual. Sorted materials are baled and stored for shipment.[65 & 66]

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[63] https://www.recyclemoreoutagamie.org/curbside-recycling-2/
[64] https://www.recyclemoreoutagamie.org/about-us/what-we-do/
[65] https://www.recyclemoreoutagamie.org/wp-content/uploads/2015/01/Tri-County-Single-Stream-Recycling-Facility-SWANA-Award-Submission.pdf
[66] A Virtual Tour of the Tri-County Recycling Facility in Appleton, Wisconsin, Outagamie County Recycling & Solid Waste YouTube Channel https://www.youtube.com/watch?v=GTGTlddHIFs

Participation Rates and Contamination Rates

According to the Wisconsin Department of Natural Resources, 94% of Wisconsin households recycle.[67] For Outagamie County, curbside recycling serves 66,000 households out of 76,237 occupied housing units, as reported by the 2020 US census, which means that approximately 87% of the households have access to recycling.

The Tri-County Recycling Program cites a contamination rate of less than 8% (calculated as residual over the volume of incoming recyclables collected). They attribute the low contamination rates to an effective educational plan, efficient sorting and processing, as well as effective staff on the conveyor lines (training). [68]

[67] https://dnr.wisconsin.gov/topic/Recycling/facts.html
[68] Tri-County Recycling Program, Outagamie County Recycling & Solid Waste YouTube Channel https://www.youtube.com/watch?v=S_qsr9nxlh4&t=77s

Appendix B

Annual Collection Cost for Scenarios

Scenario A - Automated-Side-Loader (ASL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	105	$78,000.00	$8,200,000
		Collectors	-	$-	$-
	Equipment (Annualized Costs)	Vehicle	105	$43,750.00	$4,600,000
		Carts	390,000	$6.64	$2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	105	$40,000.00	$4,200,000
		Cart Distribution, Maintenance	390,000	$10.00	$3,900,000
				Total	**$23,600,000**
	Cost Item	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
SSR (1x/week)	Collection Labor	Drivers	15	$78,000.00	$1,100,000
		Collectors	-	$ -	$ -
	Equipment (Annualized Costs)	Vehicle	15	$43,750.00	$ 600,000
		Carts	80,000	$6.64	$1,900,000
	O&M	Vehicle Maintenance, Repairs, Fuel	52	$40,000.00	$2,000,000
		Cart Distribution, Maintenance	80,000	$10.00	$2,800,000
				Total	**$3,700,000**

For Yard Waste Collections, rear-end loader (REL) vehicles, rather than automated side loaders (ASLs), are assumed for this service to accommodate the manual collection of paper-bagged and/or containerized/bundled yard waste.

Scenario A - Rear-End-Loader (REL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	135	$78,000	$ 10,500,000
		Collectors	270	$ 71,000	$ 19,200,000
	Equipment (Annualized Costs)	Vehicle	135	$43,750	$ 5,900,000
		Carts	390,000	$6.64	$2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	135	$40,000	$5,400,000
		Cart Distribution, Maintenance	390,000	$10.00	$3,900,000
				Total	**$ 47,600,000**

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
SSR (1x/week)	Collection Labor	Drivers	19	$78,000	$1,500,000
		Collectors	38	$71,000	$2,700,000
	Equipment (Annualized Costs)	Vehicle	19	$43,750	$800,000
		Carts	80,000	$6.64	$500,000
	O&M	Vehicle Maintenance, Repairs, Fuel	67	$40,000	$800,000
		Cart Distribution, Maintenance	80,000	$10.00	$800,000
	Total				**$ 7,100,000**
Yard Waste Composting (1x/week)	**Cost Item**	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
	Collection Labor	Drivers	45	$78,000	$3,500,000
		Collectors	90	$71,000	$6,400,000
	Equipment (Annualized Costs)	Vehicle	45	$43,750	$2,000,000
		Carts	315,000	$6.64	$2,100,000
	O&M	Vehicle Maintenance, Repairs, Fuel	45	$40,000	$1,800,000
		Cart Distribution, Maintenance	315,000	$10.00	$3,200,000
	Total				**$ 18,900,000**

Scenario B - Automated-Side-Loader (ASL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	105	$78,000.00	$8,200,000
		Collectors	-	$-	$-
	Equipment (Annualized Costs)	Vehicle	105	$43,750.00	$4,600,000
		Carts	390,000	$6.64	$2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	105	$40,000.00	$4,200,000
		Cart Distribution, Maintenance	390,000	$10.00	$3,900,000
				Total	**$23,600,000**
SSR (1x/week)	**Cost Item**	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
	Collection Labor	Drivers	15	$78,000.00	$1,100,000
		Collectors	-	$ -	$ -
	Equipment (Annualized Costs)	Vehicle	15	$ 43,750.00	$ 600,000
		Carts	80,000	$6.64	$1,900,000
	O&M	Vehicle Maintenance, Repairs, Fuel	52	$40,000.00	$2,000,000
		Cart Distribution, Maintenance	80,000	$10.00	$2,800,000
				Total	**$3,700,000**

For Yard Waste Collections, rear-end loader (REL) vehicles, rather than automated side loaders (ASLs), are assumed for this service to accommodate the manual collection of paper-bagged and/or containerized/bundled yard waste.

Scenario B - Rear-End-Loader (REL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	135	$78,000	$10,500,000
		Collectors	270	$ 71,000	$19,200,000
	Equipment (Annualized Costs)	Vehicle	135	$43,750	$5,900,000
		Carts	390,000	$6.64	$2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	135	$40,000	$5,400,000
		Cart Distribution, Maintenance	390,000	$10.00	$3,900,000
				Total	**$ 47,600,000**
SSR (1x/week)	**Cost Item**	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
	Collection Labor	Drivers	19	$78,000	$1,500,000
		Collectors	38	$ 71,000	$2,700,000
	Equipment (Annualized Costs)	Vehicle	19	$43,750	$800,000
		Carts	80,000	$6.64	$500,000
	O&M	Vehicle Maintenance, Repairs, Fuel	67	$40,000	$800,000
		Cart Distribution, Maintenance	80,000	$10.00	$800,000
				Total	**$ 7,100,000**
Yard Waste Composting (1x/week)	**Cost Item**	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
	Collection Labor	Drivers	45	$78,000	$3,500,000
		Collectors	90	$71,000	$6,400,000
	Equipment (Annualized Costs)	Vehicle	45	$43,750	$2,000,000
		Carts	315,000	$6.64	$2,100,000
	O&M	Vehicle Maintenance, Repairs, Fuel	45	$40,000	$1,800,000
		Cart Distribution, Maintenance	315,000	$10.00	$3,200,000
				Total	**$18,900,000**

Scenario C - Automated-Side-Loader (ASL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	105	$78,000.00	$8,200,000
		Collectors	-	$-	$-
	Equipment (Annualized Costs)	Vehicle	105	$43,750.00	$4,600,000
		Carts	390,000	$6.64	$2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	105	$40,000.00	$4,200,000
		Cart Distribution, Maintenance	390,000	$10.00	$3,900,000
	Total				**$23,600,000**
SSR (1x/week)	**Cost Item**	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
	Collection Labor	Drivers	15	$78,000.00	$1,100,000
		Collectors	-	$ -	$ -
	Equipment (Annualized Costs)	Vehicle	15	$43,750.00	$600,000
		Carts	80,000	$6.64	$1,900,000
	O&M	Vehicle Maintenance, Repairs, Fuel	52	$40,000.00	$2,000,000
		Cart Distribution, Maintenance	80,000	$10.00	$2,800,000
	Total				**$3,700,000**

For Yard Waste Collections, rear-end loader (REL) vehicles, rather than automated side loaders (ASLs), are assumed for this service to accommodate the manual collection of paper-bagged and/or containerized/bundled yard waste.

Scenario C - Rear-End-Loader (REL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	135	$78,000	$10,500,000
		Collectors	270	$71,000	$19,200,000
	Equipment (Annualized Costs)	Vehicle	135	$43,750	$5,900,000
		Carts	390,000	$6.64	$2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	135	$40,000	$5,400,000
		Cart Distribution, Maintenance	390,000	$10.00	$3,900,000
				Total	**$47,600,000**

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
SSR (1x/week)	Collection Labor	Drivers	19	$78,000	$1,500,000
		Collectors	38	$71,000	$2,700,000
	Equipment (Annualized Costs)	Vehicle	19	$43,750	$800,000
		Carts	80,000	$6.64	$500,000
	O&M	Vehicle Maintenance, Repairs, Fuel	67	$40,000	$800,000
		Cart Distribution, Maintenance	80,000	$10.00	$800,000
				Total	**$ 7,100,000**
Food +Yard Waste Composting (1x/week)	**Cost Item**	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
	Collection Labor	Drivers	45	$78,000	$ 3,500,000
		Collectors	90	$ 71,000	$ 6,400,000
	Equipment (Annualized Costs)	Vehicle	45	$43,750	$ 2,000,000
		Carts	315,000	$ 6.64	$ 2,100,000
	O&M	Vehicle Maintenance, Repairs, Fuel	45	$ 40,000	$ 1,800,000
		Cart Distribution, Maintenance	315,000	$ 10.00	$ 3,200,000
				Total	**$ 18,900,000**

Scenario D - Automated-Side-Loader (ASL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	210	$78,000.00	$16,400,000
		Collectors	-	$-	$-
	Equipment (Annualized Costs)	Vehicles	210	$43,750.00	$9,200,000
		Carts	390,000	$6.64	$2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	210	$40,000.00	$14,700,000
		Cart Distribution, Maintenance	390,000	$10.00	$5,900,000
				Total	**$48,900,000**
SSR (1x/week)	**Cost Item**	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
	Collection Labor	Drivers	15	$78,000.00	$1,100,000
		Collectors	-	$ -	$ -
	Equipment (Annualized Costs)	Vehicle	15	$ 43,750.00	$ 600,000
		Carts	80,000	$ 6.64	$1,900,000
	O&M	Vehicle Maintenance, Repairs, Fuel	52	$ 40,000.00	$ 2,000,000
		Cart Distribution, Maintenance	80,000	$ 10.00	$ 2,800,000
		Total			**$3,700,000**

For Yard Waste Collections, rear-end loader (REL) vehicles, rather than automated side loaders (ASLs), are assumed for this service to accommodate the manual collection of paper-bagged and/or containerized/bundled yard waste.

Scenario D - Rear-End-Loader (REL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	270	$78,000	$ 21,100,000
		Collectors	541	$ 71,000	$ 38,400,000
	Equipment (Annualized Costs)	Vehicle	270	$43,750	$ 11,800,000
		Carts	390,000	$ 6.64	$ 2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	270	$ 40,000	$ 18,900,000
		Cart Distribution, Maintenance	390,000	$ 10.00	$ 5,900,000
				Total	**$ 98,800,000**
SSR (1x/week)	**Cost Item**	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
	Collection Labor	Drivers	19	$78,000	$ 1,500,000
		Collectors	38	$ 71,000	$ 2,700,000
	Equipment (Annualized Costs)	Vehicle	19	$43,750	$ 800,000
		Carts	80,000	$ 6.64	$ 500,000
	O&M	Vehicle Maintenance, Repairs, Fuel	67	$ 40,000	$ 800,000
		Cart Distribution, Maintenance	80,000	$ 10.00	$ 800,000
				Total	**$ 7,100,000**
Yard Waste Composting (1x/week)	**Cost Item**	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
	Collection Labor	Drivers	45	$78,000	$ 3,500,000
		Collectors	90	$ 71,000	$ 6,400,000
	Equipment (Annualized Costs)	Vehicle	45	$43,750	$ 2,000,000
		Carts	315,000	$ 6.64	$ 2,100,000
	O&M	Vehicle Maintenance, Repairs, Fuel	45	$ 40,000	$ 1,800,000
		Cart Distribution, Maintenance	315,000	$ 10.00	$ 3,200,000
				Total	**$ 18,900,000**

Scenario E - Automated-Side-Loader (ASL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	105	$78,000.00	$8,200,000
		Collectors	-	$-	$-
	Equipment (Annualized Costs)	Vehicle	105	$43,750.00	$4,600,000
		Carts	390,000	$6.64	$2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	105	$40,000.00	$4,200,000
		Cart Distribution, Maintenance	390,000	$10.00	$3,900,000
				Total	**$23,600,000**
	Cost Item	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
SSR (1x/week)	Collection Labor	Drivers	15	$78,000.00	$1,100,000
		Collectors	-	$ -	$ -
	Equipment (Annualized Costs)	Vehicle	15	$ 43,750.00	$ 600,000
		Carts	80,000	$ 6.64	$1,900,000
	O&M	Vehicle Maintenance, Repairs, Fuel	52	$ 40,000.00	$2,000,000
		Cart Distribution, Maintenance	80,000	$ 10.00	$2,800,000
				Total	**$3,700,000**

For Yard Waste Collections, rear-end loader (REL) vehicles, rather than automated side loaders (ASLs), are assumed for this service to accommodate the manual collection of paper-bagged and/or containerized/bundled yard waste.

Scenario E - Rear-End-Loader (REL) Option

	Cost Item	Description	# of Units	Unit Cost	Extended Cost
MSW (1x/week)	Collection Labor	Drivers	135	$78,000	$ 10,500,000
		Collectors	270	$ 71,000	$ 19,200,000
	Equipment (Annualized Costs)	Vehicle	135	$43,750	$ 5,900,000
		Carts	390,000	$ 6.64	$ 2,600,000
	O&M	Vehicle Maintenance, Repairs, Fuel	135	$ 40,000	$ 5,400,000
		Cart Distribution, Maintenance	390,000	$ 10.00	$ 3,900,000
				Total	**$ 47,600,000**
	Cost Item	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
SSR (1x/week)	Collection Labor	Drivers	19	$78,000	$ 1,500,000
		Collectors	38	$ 71,000	$ 2,700,000
	Equipment (Annualized Costs)	Vehicle	19	$43,750	$ 800,000
		Carts	80,000	$ 6.64	$ 500,000
	O&M	Vehicle Maintenance, Repairs, Fuel	67	$ 40,000	$ 800,000
		Cart Distribution, Maintenance	80,000	$ 10.00	$ 800,000
				Total	**$ 7,100,000**
	Cost Item	**Description**	**# of Units**	**Unit Cost**	**Extended Cost**
Food + Yard Waste Composting (1x/week)	Collection Labor	Drivers	48	$78,000	$ 3,700,000
		Collectors	96	$ 71,000	$ 6,800,000
	Equipment (Annualized Costs)	Vehicle	48	$43,750	$ 2,100,000
		Carts	330,000	$ 6.64	$ 2,200,000
	O&M	Vehicle Maintenance, Repairs, Fuel	48	$ 40,000	$ 1,900,000
		Cart Distribution, Maintenance	330,000	$ 10.00	$ 3,300,000
				Total	**$ 20,100,000**

Assumptions

Tables 62 and 63 summarize the key assumptions used in the scenario analysis, including the unit cost and annualized cost of carts and collection vehicles.

Table 62. One-Time and Annualized Cart Cost Assumptions Used in Scenario Analysis

Lifespan (years)	10	
Cart Prices	**One-Time Cost**	**Annualized Cost**
35-gallon	$ 48.26	$4.83
65-gallon	$ 58.33	$5.83
95-gallon	$ 66.42	$ 6.64
Cart pricing from Miami-Dade County, Florida Sourcewell Contract[69]		

Table 63. One-Unit and Annualized Vehicle Cost Assumptions Used in Scenario Analysis

Lifespan (years)	8	
New Collection Vehicle Cost	**Unit Price**	**Annualized Cost**
Fully Automated Side Loader (ASL)	$350,000.00	$43,750.00
Rear-Loader (REL)	$350,000.00	$43,750.00

Collections Assumptions

Additional cost-related assumptions used in the Scenario analysis are detailed below.

- Labor costs provided by U.S. Bureau of Labor Statistics May 2023 National Industry-Specific Occupational Employment and Wage Estimates – Heavy and Tractor-Trailer Truck Drivers (53-3032) and Refuse and Recyclable Material Collectors (53-7081)
- 44% Fringe Benefit rate assumed on drivers and collectors
- 20% Spare Vehicle Ratio
- 700 households per MSW REL route, once a week collection
- 900 households per MSW ASL route, once a week collection
- 1,000 households per SS REL route, once a week collection
- 1,300 households per SS recycling ASL route, once a week collection
- 1,680 households per yard waste REL route, once a week collection

69 https://www.miamidade.gov/apps/isd/StratProc/ProcurementNAS/pdf_files/RFP00254/Award_Addendum_No._23.pdf

Appendix C

Additional Industrial Food Waste Diversion Options

Anaerobic Co-Digestion of Industrial Food Waste or Commercial Food Waste at WWTPS

Scenario E emphasizes the co-collection and composting of food waste alongside green waste or the AD of recovered wet organics in a standalone AD. However, anaerobic co-digestion of food waste at wastewater treatment plants (WWTP) has potential as an alternative or supplemental method for diverting food waste.

Co-digestion of food waste at WWTPs is a widely adopted food waste diversion method that has been extensively studied and implemented globally. This approach is both practical and cost-effective, leveraging existing infrastructure and personnel and utilizing energy produced to reduce CapEx and operational costs. Constructing and operating a standalone AD facility for food waste.

ADs at WWTPs can capture biogas during the digestion process, offsetting demand for heat and electricity. The dewatered solids can be composted afterward, thereby reducing reliance on landfilling and nutrients from liquid digestate can be recovered enabling discharge.

Incorporation of industrial food waste, that have low solids content and high energy content, including certain food processing wastes or fats, oils and greases (FOG) are common. These materials increase biogas production while the sewage wastewater provides buffering capacity. Front-end food receiving, and biogas utilization capacity will need to be added to the WWTP, and long-term contracts should be secured to manage process parameters and maintain consistency. An example would be the recent project at Broward County Water and Wastewater Division to collect FOG for processing in its AD with biogas utilized for cogeneration to offset utility power purchases (ENGIE North America, 2021).

Recently we have seen an increase in WWTPs that co-digest SSO with sewage sludge to increase biogas production and improve waste management with examples in California, New York and Toronto. To take in food waste at large scale, it is necessary to establish pre-processing facilities capable of converting source-separated food waste into a slurry for efficient digestion.

Broward County operates an extensive network of WWTPs with varying capabilities. Many of these facilities could be adapted to accommodate food waste co-digestion.

Typically, larger WWTPs have a greater opportunity for biogas capture. The U.S. EPA recommends a threshold of greater than 1MGD influent wastewater flow (US EPA, 2024a). Assessing the potential to co-digest industrial, commercial or source-separated food waste at these facilities includes evaluating the existing and potential capacities, operational capabilities, and costs associated with retrofitting the facilities as well as pre-treatment infrastructure.

Leveraging existing WWTP facilities for biogas capture, followed by the composting of biosolids, may offer an efficient alternative for parts of the County where food waste composting is not feasible. However, evaluating the potential for specific facilities, determining the financial impacts of increased sludge levels resulting from food waste addition and integration into WWTP per- and polyfluoroalkyl substances (PFAS) mitigation strategies (see Task 9 Innovative Future Technologies White Paper) is outside the scope of this plan.

Direct Land Application of RGW

The direct land application of raw shredded green waste (RGW) through soil incorporation—mixing green waste into the topsoil at specified loading rates using plows or mixers—presents a promising non-landfill solution for the County's western agriculturally-depleted legacy citrus grove plots. This method could also benefit other crop soils, such as sugarcane and cotton, and potentially extend to adjacent County agricultural lands once proven successful.

California has set a precedent for RGW land application, driven by stringent regulations. The practice has become increasingly common and well-studied in that state. While implementing this approach in Florida may require state or university research, its potential benefits are significant. These include reduced processing costs compared to composting, restoration of depleted soils, and diversion of green waste from landfills, where it would otherwise decompose into greenhouse gases. Implementing this strategy may necessitate obtaining a solid waste or specialized state permit.

This approach could be a highly effective and environmentally beneficial strategy for managing South Florida's lignin-rich yard waste while supporting the restoration of Central Florida's agricultural lands. However, the method remains unproven in Florida and was not included as a scenario component due to the need for demonstration and monitoring. Ensuring appropriate loading rates and soil chemistry after incorporation is critical to success. Once established, this approach could reclaim valuable agricultural acreage by enriching soils with separated, plastic-free yard waste.

Appendix D

Warm Model Inputs, Assumptions and Summary Results

Assumptions:

- Only SSR, Food Waste, and Yard Waste were modeled - expected to underestimate benefit by 20-30% due to special recycling, reuse, and other diversion.
- SSR modeled under general category of Mixed Recyclables
- Recovered Fiber modeled as newspaper recycling
- Biochar and Mulching of Yard Waste modeled as composting. This underestimates the benefit as lower operational impacts are incurred and benefits of carbon sequestration are likely underestimated.

Results Summary

Model inputs:

To account for the avoided electricity-related emissions in the landfilling and combustion pathways, the U.S. EPA assigns the appropriate regional "marginal" electricity grid mix emission factor based on your location.

- Florida
- South Atlantic

To estimate the benefits from source reduction, the U.S. EPA usually assumes that the material that is source reduced would have been manufactured from the current mix of virgin and recycled inputs.

- Current Mix

The emissions from landfilling depends on whether the landfill where your waste is disposed of has a landfill gas (LFG) control system. If you do not know whether your landfill has LFG control, select:

- LFG recovery

If your landfill has gas recovery, does it recover the methane for energy or flare it?

- Recover for energy (based on Broward County Landfill, Monarch flares)

For landfills that recover gas, the landfill gas collection efficiency will vary throughout the life of the landfill. Based on a literature review of field measurements and expert discussion, a range of collection:

- Worst-case collection (based on collection efficiency of 50% - GHG Summary Report)

Which of the following moisture conditions and associated bulk MSW decay rate (k) most accurately describes the average conditions at the landfill?

- Wet k=0.06 (>40" /yr Yearly Average Rainfall in Florida - Current Results)

For AD of food waste materials (including beef, poultry, grains, bread, fruits and vegetables, and dairy products), please choose the appropriate type of AD process used.

- Wet digestion

WARM assumes that digestate resulting from AD processes will be applied to land. In many cases, the digestate is cured before land application.

- Cured- DEFAULT

Emissions that occur during transport of materials to the management facility are included in this model. You may use default transport distances, indicated in the table below, or provide information:

- Use default distances

WARM Results

Scenario A

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons AD	Total $MTCO_2E$
Food Waste	NA	790k	-	4.8k	-	540k
Yard Trimmings	NA	480k	-	-	-	(45k)
Mixed Recyclables	360k	560k	530k	NA	NA	(1.3M)

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Food Waste	-	NA	780k	10k	6k	-	530k
Yard Trimmings	NA	NA	120k	-	370k	-	(30k)
Mixed Recyclables	NA	930k	-	520 k	NA	NA	(2,861,649)

	Change (Alt - Base) $MTCO_2E$
	(9k)
	15k
	(1.5M)
Total Change in GHG Emissions (MTCO2E):	**(1.5M)**

Scenario B

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons AD	Total $MTCO_2E$
Food Waste	NA	790k	-	4.8k	-	540k
Yard Trimmings	NA	480k	-	-	-	(45k)
Mixed Recyclables	360k	560k	530k	NA	NA	(1.3M)

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Food Waste	-	NA	750k	10k	36k	-	510k
Yard Trimmings	NA	NA	120k	-	370k	-	(30k)
Mixed Recyclables	NA	930k	-	520 k	NA	NA	(2.9M)

	Change (Alt - Base) $MTCO_2E$
	(33k)
	15k
	(1.6M)
Total Change in GHG Emissions (MTCO2E):	**(1.6M)**

Scenario C

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons AD	Total $MTCO_2E$
Food Waste	NA	790k	-	4.8k	-	540k
Yard Trimmings	NA	480k	-	-	-	(45k)
Mixed Recyclables	360k	560k	530k	NA	NA	(1.3M)

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Food Waste	-	NA	440k	10k	340k	-	260k
Yard Trimmings	NA	NA	120k	-	366,582	-	(30k)
Mixed Recyclables	NA	930k	-	520 k	NA	NA	(2.8M)

	Change (Alt - Base) $MTCO_2E$
	(280k)
	15k
	(1.6M)
Total Change in GHG Emissions (MTCO2E):	**(1.8M)**

Scenario D

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons AD	Total $MTCO_2E$
Food Waste	NA	790k	-	4.8k	-	540k
Yard Trimmings	NA	480k	-	-	-	(45k)
Mixed Recyclables	360k	560k	530k	NA	NA	(1.3M)

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Food Waste	-	NA	670k	-	4.8k	120k	450k
Yard Trimmings	NA	NA	120k	-	370k	-	(30k)
Mixed Recyclables	NA	220k	530k	700 k	NA	NA	(970k)

	Change (Alt - Base) $MTCO_2E$
	(88k)
	15k
	340k
Total Change in GHG Emissions (MTCO2E):	**260k**

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Exhibit 2
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Scenario E																
Newspaper	-	76k	-	NA	NA	(72k)		Newspaper	-	76k	-	-	NA	NA	(200k)		(130k)
Food Waste	NA	790k	-	4.8k	-	540k		Food Waste	-	NA	670k	-	4.8k	120k	270k		(55k)
Yard Trimmings	NA	480k	-	-	-	(45k)		Yard Trimmings	NA	NA	120k	-	370k	-	(47k)		67k
Mixed Recyclables	360k	560k	530k	NA	NA	(1.3M)		Mixed Recyclables	NA	1M	-	360 k	NA	NA	(3M)		(1.7M)
													Total Change in GHG Emissions (MTCO2E):			**(1.8M)**

Appendix E

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Appendix J

Broward County 2023 Waste Characterization Study

Broward County
2023 Waste Characterization Study
Final Report

Broward County, Florida
Solid Waste and Recycling Services
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Plantation, FL 33324

SCS ENGINEERS

09222033.00 | April 30, 2024

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A – Health & Safety Plans
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1 EXECUTIVE SUMMARY

Broward County together with 30 of its 31 municipalities created the Solid Waste Working Group (SWWG) in 2019 to explore recycling opportunities and provide long-term and sustainable solid waste solutions. The SWWG is comprised of members from various municipalities and the County. To inform the SWWG as they consider programs and facilities that meet the direction of the Interlocal Agreement (ILA) developed by the SWWG, SCS Engineers (SCS) was engaged to perform a waste characterization study to examine and document what is generated by businesses and residents. The objectives of the waste characterization study are as follows:

1. Use field collection methods that measure the types and representative proportions of materials disposed of and recycled in Broward County,

2. Develop countywide waste composition profiles for the following four waste streams:

    1) Residential/Commercial recycling
    2) Residential municipal solid waste
    3) Commercial municipal solid waste
    4) Construction and demolition/bulk waste

3. Perform standard statistical analyses of the waste composition data and calculate the 90 percent confidence intervals for each material type,

4. Estimate the proportion of waste currently disposed of in the county that can be diverted through new or expanded reuse, recycling, and composting programs, and

5. Document the current study to establish a baseline so that it can be compared to future waste characterization studies to assess waste disposal trends and to evaluate impact of future programs and facilities.

At the direction of the SWWG, Broward County contracted with SCS to perform a waste characterization study. SCS coordinated with both private and county-owned facilities to select appropriate locations to sample waste and recyclables and develop site-specific sampling plans and health and safety plans for each selected location.

Over the course of four seasonal field efforts, 135 waste samples (from residential and commercial sources) and 50 recycling samples (from residential and commercial sources) were collected, weighing in total 30,000 and 8,400 pounds, respectively. Recycling samples were hand sorted into 17 material types[1] (see **Table 2**); waste samples were hand-sorted into 46 material types (see **Table 3**). In addition, over 250 waste loads containing construction and demolition debris (C&D) or bulky materials were visually characterized into 30 material types (see **Table 4**).

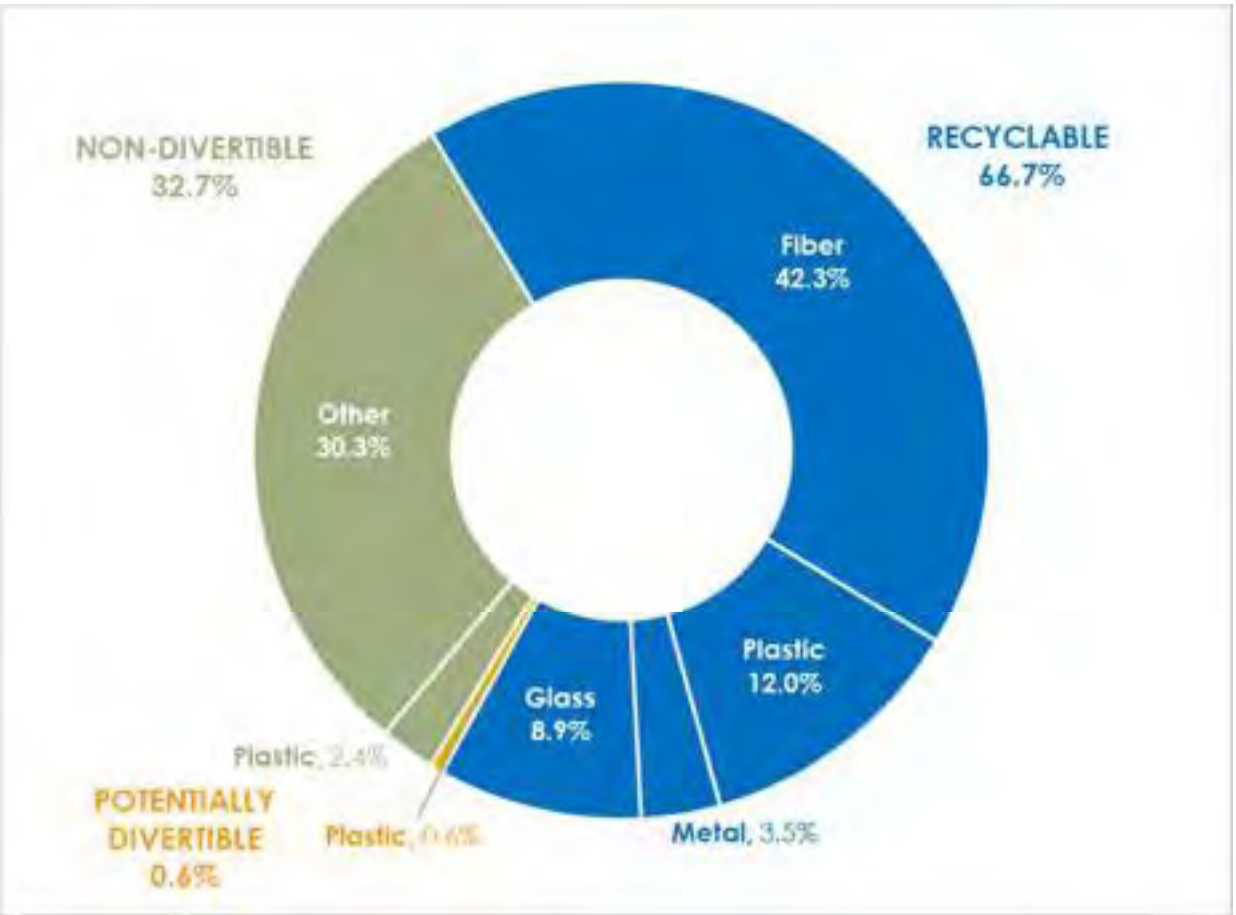
Summary graphics that represent the four waste streams are presented below.

[1] It should be noted that residential recycling samples are derived from multiple municipalities with varying recycling programs which support different recyclable materials.

1.1 SOURCE SEPARATED RECYCLING

As presented in **Exhibit 1**, about 67 percent of the recycling stream consists of materials that are accepted for recycling programs in the County, including cardboard, newspaper, #1 and #2 plastic containers, metal cans, and glass bottles. The remaining 33 percent of the recyclable stream are materials that are not accepted for recycling and have been classified as either non-divertible (32.7 percent) or potentially divertible (less than one percent).

Exhibit 1. Residential/Commercial Recyclables Stream Classification by Material Type



Percentages may not add up to 100% due to rounding. Composition is based on 50 150-pound samples.

Individual material types that comprise the largest proportions of residential/commercial recycling include:

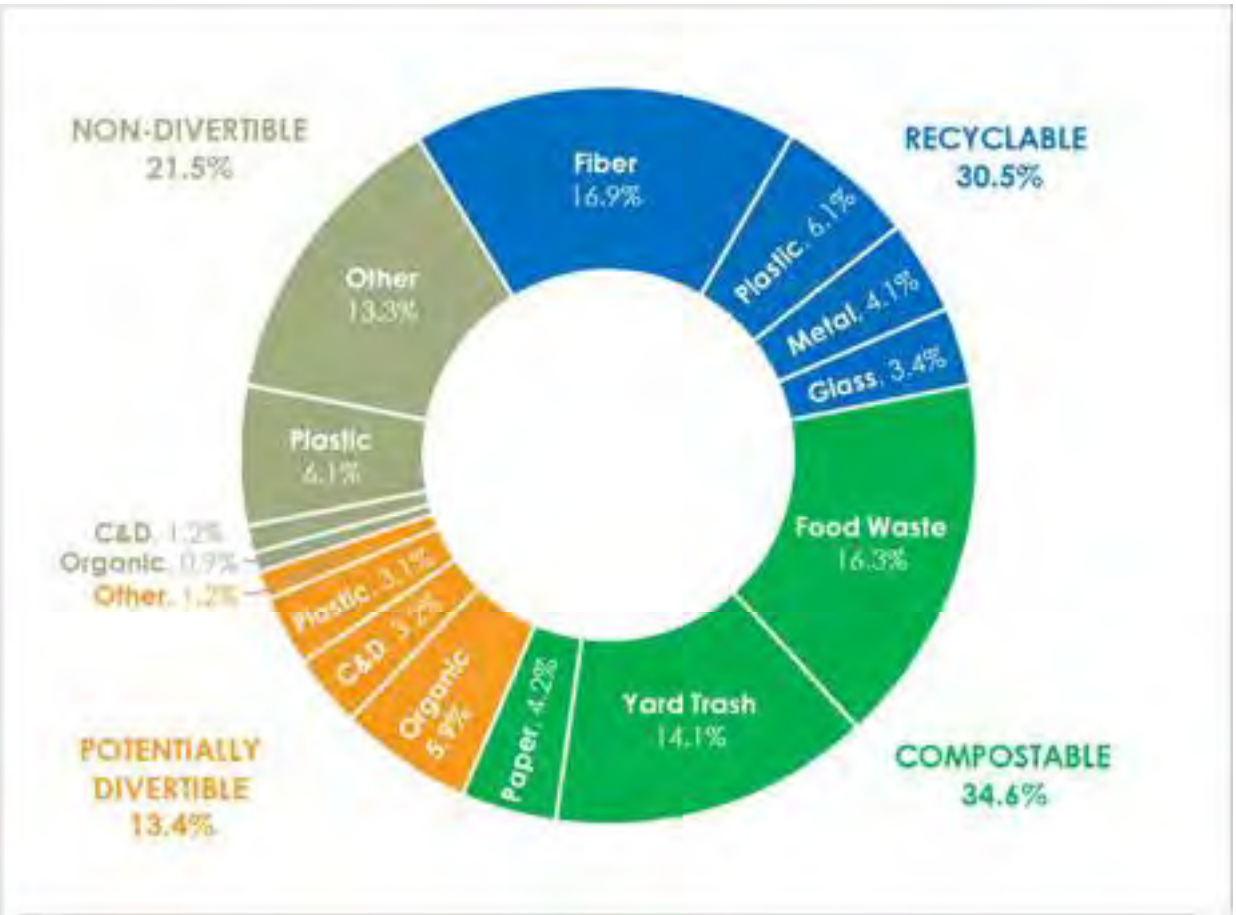
- Residue (contamination) at 32.7 percent (non-divertible)
- Corrugated Cardboard at 19.2 percent (recyclable)
- Mixed Paper at 11.6 percent (recyclable)
- Glass Containers at 8.9 percent (recyclable)
- PET Bottles at 5.8 percent (recyclable)

Refer to **Table 5** for detailed composition by material type.

1.2 RESIDENTIAL MSW

As presented in **Exhibit 2**, about 31 percent of the residential MSW material stream consists of recyclable materials that could be diverted through existing programs. Another 35 percent of residential MSW is compostable, which includes food scraps that comprise 16 percent. The remaining composition includes about 13 percent potentially divertible materials and 22 percent is non-divertible.

Exhibit 2. Residential MSW Classification by Material Type



Percentages may not add to 100% due to rounding. Composition is based on 91 200-pound samples.

Individual material types that comprise the largest proportions of residential MSW include:

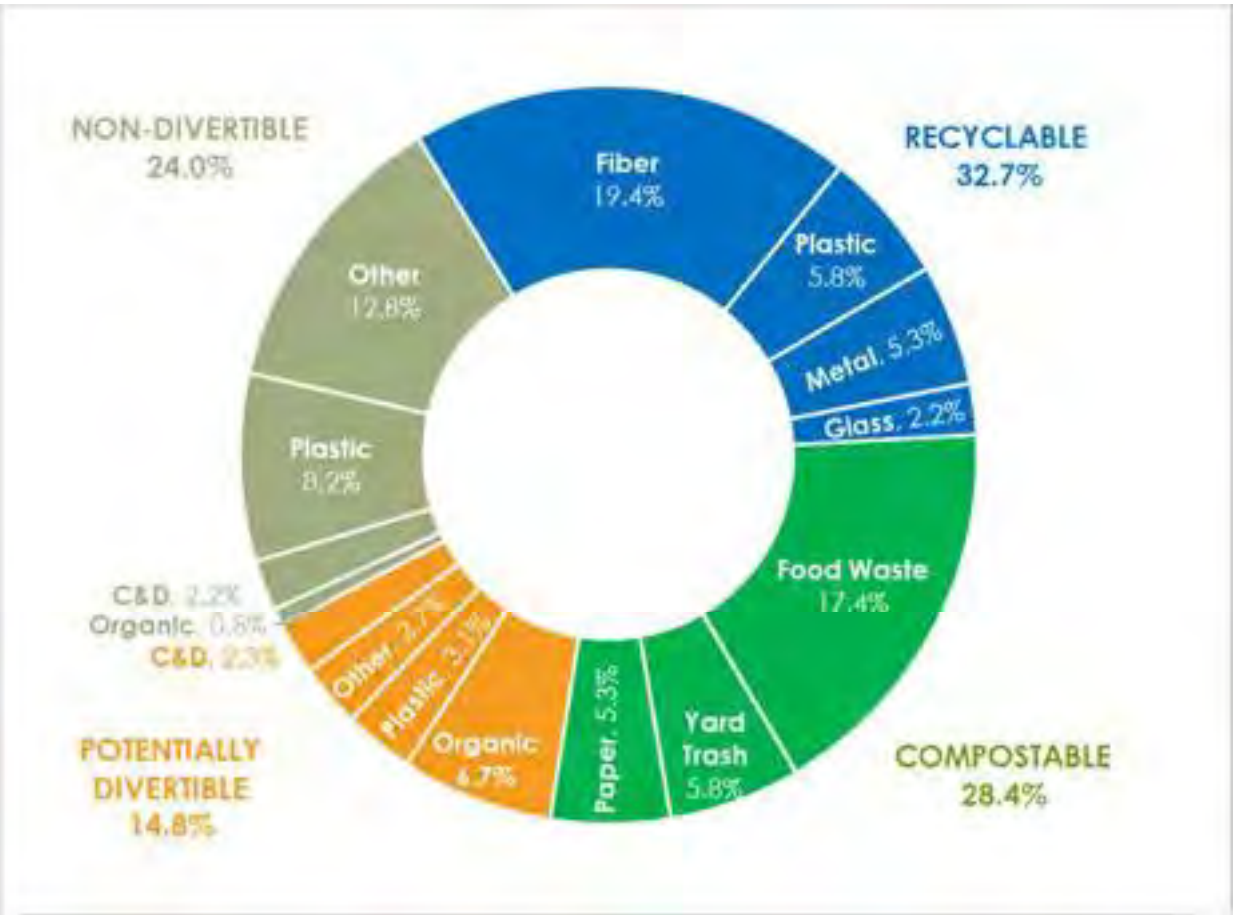
- Food Waste at 16.3 percent (compostable)
- Yard Waste at 14.1 percent (compostable)
- Miscellaneous materials (not classified) at 13.3 percent (non-divertible)
- Mixed Paper at 8.9 percent (recyclable)
- Textiles at 5.7 percent (potentially divertible)

Refer to **Table 6** for detailed composition by material type.

1.3 COMMERCIAL MSW

As presented in **Exhibit 3**, about 33 percent of the commercial MSW material stream consists of recyclable materials that could be diverted through existing programs. Another 28 percent of commercial MSW is compostable, including food scraps that comprise 17 percent. The remaining composition includes about 15 percent potentially divertible materials and 24 percent non-divertible materials.

Exhibit 3. Commercial MSW Classification by Material Type



Percentages may not add up to 100% due to rounding. Composition is based on 44 200-pound samples.

Individual material types that comprise the largest proportions of commercial MSW include:

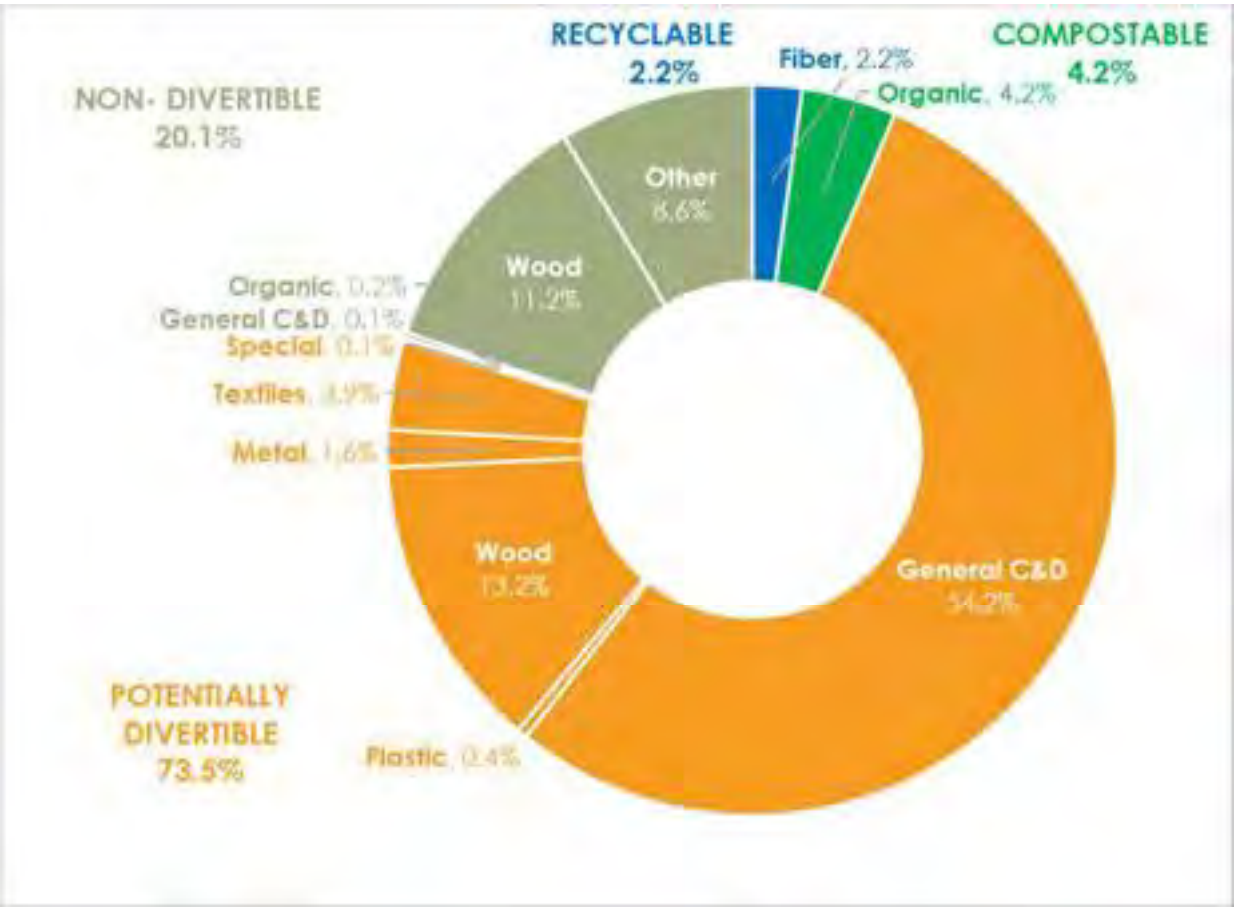
- Food Waste at 17.4 percent (compostable)
- Miscellaneous materials (not classified) at 12.8 percent (non-divertible)
- Corrugated Cardboard at 8.7 percent (recyclable)
- Mixed Paper at 6.9 percent (recyclable)
- Yard Trash at 5.8 percent (compostable)

Refer to **Table 7** for detailed composition by material type.

1.4 CONSTRUCTION AND DEMOLITION DEBRIS/BULKY WASTE

As presented in **Exhibit 4**, nearly three-quarters of the disposed C&D/bulky waste material stream is classified as potentially divertible, which includes items such as concrete, brick, asphalt roofing, wood, and textiles. SCS estimated that about two percent of this material stream is recyclable cardboard and four percent is organic material, primarily yard waste. The remaining 20 percent is classified as non-divertible and includes items such as treated wood, bagged waste, bulky waste, and insulation.

Exhibit 4. C&D/Bulky Waste Classification by Material Type



Percentages may not add up to 100% due to rounding.
Composition is based on 252 visually characterized waste loads.

Individual material types that comprise the largest proportions of C&D/Bulky Waste include:

- Asphalt Roofing at 25.7 percent (potentially divertible)
- Clean Engineered Wood at 13.2 percent (potentially divertible)
- Treated Wood at 11.2 percent (potentially divertible)
- Brick at 8.8 percent (potentially divertible)
- Concrete at 8.0 percent (potentially divertible)

Refer to **Table 8** for detailed composition by material type.

1.5 CONCLUSIONS AND RECOMMENDATIONS

This study provides data and information about the disposed and recycled waste stream in Broward County to evaluate the effectiveness of existing waste diversion programs and identify opportunities to create programs or develop facilities to divert additional materials from landfill disposal or incineration. Comparison of future waste compositions to the waste compositions in this report can also help identify trends and changes in waste generation in the County.

The following recommendations are based on the waste composition data presented in this report:

1. **Improving Existing Recycling Behavior:** By weight, 30.5 percent of materials placed in recycling collection containers are not recyclable in Broward County, either because there is no viable market or because the material is not considered recyclable (e.g., food). Public education and outreach should inform residents and businesses about proper recycling.

2. **Reduce the Amount of Recyclable Material Disposed as MSW:** By weight, 30.5 of the County's residential MSW and 32.7 percent of commercial MSW are recyclable materials. This represents a lost opportunity to conserve resources, receive revenue from the sale of recyclable commodities, and reduce greenhouse gas emissions from disposal and mining for virgin materials. Cardboard and mixed paper comprise the largest portions of recyclable materials in MSW.

3. **Focus on Diverting Compostable Materials**: Compostable materials (compostable paper, food, and yard trash) comprise 34.6 percent of residential MSW and 28.4 percent of commercial MSW. There is significantly more yard trash in residential MSW than commercial MSW. Nationwide, there continues to be growing interest in diverting materials for composting and other organic processing technologies. The opportunity for diverting compostable materials in Broward County is tremendous (34.6 percent of residential waste and 28.4 percent of commercial waste is compostable), and the County should further assess programs, facilities, and technologies for processing organics.

4. **Focus on Programs to Further Divert C&D/Bulky Waste:** About 80 percent of C&D/Bulky waste is recyclable (cardboard), compostable, or potentially divertible. The County can assess markets for recovered C&D materials in the region and could work with contractors and self-haulers to separate materials that could be recovered. Asphalt roofing, clean engineered wood, concrete and brick comprise the greatest portions of C&D/Bulky waste. The Broward County Landfill (BCL) also could develop holding areas for divertible materials that are segregated and then transport them to a processor when sufficient quantities accumulate. This could promote waste diversion and reduce the financial burden on small contractors and self-haulers to recycle.

5. **Continue Performing Waste Characterization Studies:** Over the last two decades, waste characterization studies have provided local governments with valuable information on how the waste stream is changing. This allows governments to make decisions about the programs and policies needed to reduce disposal, recover resources, and boost the economy. The County should continue conducting these studies on an incremental basis to further track changes in the waste stream.

2 BACKGROUND

Broward County together with 30 of its 31 municipalities created the Solid Waste Working Group (SWWG) in 2019 to explore recycling opportunities and provide long-term and sustainable solid waste solutions. To inform the SWWG as they consider programs and facilities that meet the direction of the Interlocal Agreement (ILA) developed by the SWWG, SCS was engaged to perform a waste characterization study to examine and document what is being generated. The objectives of the waste characterization study are as follows:

1. Use field collection methods that measure the types and representative proportions of materials disposed of and recycled in Broward County,

2. Develop countywide waste composition profiles for the following four waste streams:

    1) Residential/Commercial recycling
    2) Residential municipal solid waste
    3) Commercial municipal solid waste
    4) Construction and demolition/bulk waste

3. Perform standard statistical analyses of the waste composition data and calculate the 90 percent confidence intervals for each material type,

4. Estimate the proportion of waste currently disposed of in the county that can be diverted through new or expanded reuse, recycling, and composting programs, and

5. Document the current study to establish a baseline so that it can be compared to future waste characterization studies to assess waste disposal trends and to evaluate impact of future programs and facilities.

The SWWG through Broward County contracted with SCS to perform a multi-season waste characterization study. SCS coordinated with both private and county-owned facilities to select appropriate locations to sample waste and recyclables and develop site-specific sampling plans and health and safety plans for each selected location.

Broward has 31 municipalities and the Broward Municipal Services District (unincorporated Broward), the majority of which have one exclusive franchised hauler for collection of residential waste. Commercial waste collection is also franchised with most municipalities having multiple haulers. The county is home to a population of just under two million residents living in 867,215 households, 67 percent of which are single-family homes. There are over 67,000 businesses providing over 710,000 jobs in the County. The top five industries by employment include retail trade, healthcare and social assistance, accommodation and food service, administrative and waste management service, and professional, scientific, and technical services.

This study assessed four separate waste streams generated:

- **Source Separated Recycling (SSR):** Most municipalities are serviced by private haulers that direct-haul SSR (separated at the point of origin) from residential and commercial sources to the Deerfield Beach Recycling and Transfer Facility. From the Transfer Facility, the materials are aggregated and transported via transfer trailer to Reuter Recycling in Pembroke Pines for processing. Recyclable materials from both residential and commercial sources are combined prior to delivery to Reuter Recycling.

- **Municipal Solid Waste (MSW):** A significant amount of MSW generated in Broward County is collected by private and municipal haulers and disposed of at the South Broward Waste-to-Energy Facility in Fort Lauderdale (owned and operated by WIN Waste Innovations). To reduce transportation time, many haulers deliver waste to the North Broward Transfer Station (owned by Waste Management, Inc. and operated by WIN Waste Innovations) in unincorporated Broward near Pompano Beach where it is aggregated and eventually transported to a final disposal destination.

  Representatives at WIN Waste Innovations provided accommodations to sample incoming waste deliveries at the North Broward Transfer Station. Waste loads from the following communities were sampled: Coconut Creek, Coral Springs, Davie, Fort Lauderdale, Lauderdale Lakes, Lauderhill, Lighthouse Point, Margate, North Lauderdale, and Tamarac,

  - Residential, generated by mostly single-family homes, and
  - Commercial, generated by businesses, institutions, and industrial operations.

- **Construction and Demolition Debris (C&D) and Bulky Materials:** The Broward County Landfill (BCL) receives a significant amount of C&D and self-hauled bulky waste materials from a broad spectrum of municipalities and generating sectors. This site was selected because:

  - Only waste originating from within Broward County is accepted.

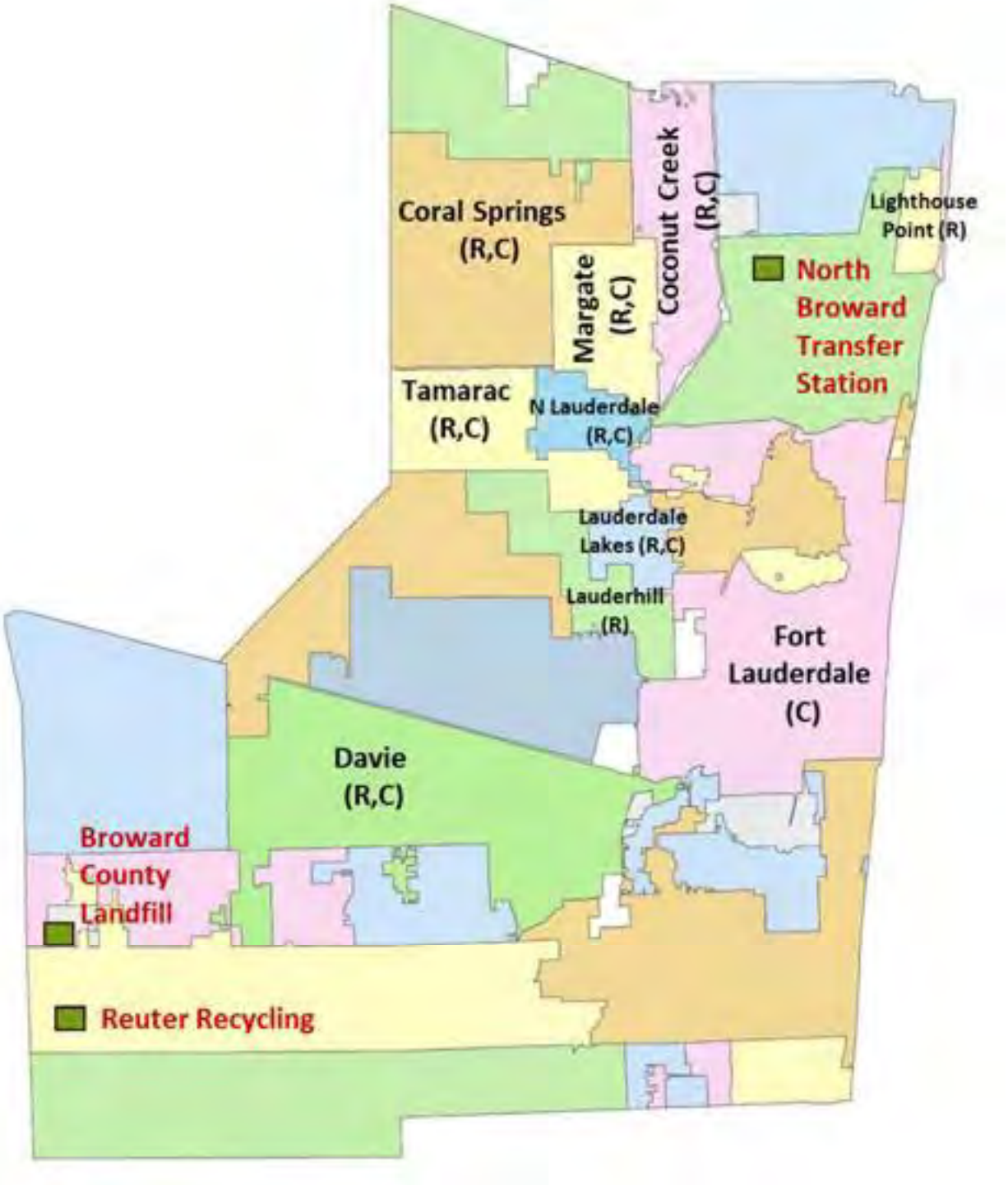
  - The site prohibits disposal of MSW, hazardous waste, biomedical waste, lead-acid batteries, used oil, liquid waste (unless specifically approved by an authorized individual), and waste containing polychlorinated biphenyls (PCB's),

  - The site volunteered to accommodate the visual characterization staff and provided space to observe and record contents of waste loads.

  - The BCL does not accept bulk waste materials from franchise haulers providing service to municipalities. C&D is typically generated by larger commercial establishments while homeowners and small businesses tend to generate what is categorized as bulky waste materials.

MSW and SSR sampling included manually sorting samples from residential and commercial sources. C&D/Bulky waste was visually characterized. **Exhibit 5** presents a map of the facilities where fieldwork was conducted and identifies the cities for which MSW was sampled. An "R" represents residential MSW, and "C" represents commercial MSW.

Exhibit 5. Map of Facilities Where Fieldwork Was Conducted and Cities Incorporated into MSW Sampling



3 METHODS

This section details the methods for completing the material characterization study for the County. Considerable planning was involved in the design and execution of field sampling for each material stream. Our field efforts prioritized the following:

- **Health and Safety** – The top priority was the health and safety of all individuals completing field activities for this project. This included SCS and its subcontractors as well as the facility staff who provided support. **Appendix A** contains site-specific health and safety plans for each site where fieldwork was conducted.

- **Reliable Data and Results** – Development of a sampling plan for each site and coordination with facility staff were key to obtaining representative data for the material streams evaluated as part of this project. **Appendix B** contains the field procedures for the study; pertinent sections are included below.

3.1 HEALTH AND SAFETY

A site-specific health and safety plan was developed for each solid waste facility where fieldwork was performed for this project. Each plan detailed site-specific hazards the team needed to understand to perform the work safely and special hazards involved in handling and characterizing MSW and C&D materials. Site operators reviewed each plan prior to fieldwork to confirm conformance to facility requirements. The health and safety plans are included in Appendix A.

3.2 PROJECT SCHEDULE AND FIELDWORK SUMMARY

Field activities for this project occurred over four (4) seasons beginning in August 2022 and concluding in June 2023 and are summarized in **Table 1.** Four seasonal field efforts were included so that the broad range of conditions that affect waste composition such as tourism and climate would be incorporated; hence the waste composition derived would be more representative and hence improve reliability of results.

Each seasonal field activity varied in duration to accommodate evaluation of multiple streams (MSW, recyclables, and C&D) over the course of a year. Field activities were scheduled for times when normal waste generation conditions were expected. This meant field activities avoided holidays and other special events, so the materials characterized were representative of typical materials generated in Broward County. Field activities were also scheduled when sufficient quantities of MSW were delivered to the North Broward Transfer Station, recyclables to Reuter Recycling, and C&D to the Broward County Landfill.

The number of samples obtained and characterized from each generating sector for both waste and recyclable materials was established in the field procedures, included in **Appendix B**. The distribution of samples was based on material generation quantities by sector. In general, SCS prioritized obtaining one waste sample per collection vehicle. However, truck arrival times varied significantly, which necessitated obtaining multiple samples from some trucks to maintain sorting momentum and to make the best use of the field team's time and resources. A total of 135 MSW samples were manually characterized, 50 samples of recyclable materials were manually characterized, and 252 samples of C&D were visually characterized. **Table 1** details each seasonal field sampling event and documents the number and type of samples characterized.

Table 1. Sampling Schedule by Season

Season	Days in the Field	Material Stream		
		Recyclables Reuter Recycling	**MSW** North Broward Transfer Station	**C&D** Broward County Landfill
Summer Aug/Sep 2022	11	20 samples	50 samples	60 samples
Fall December 2022	4	--	30 samples	61 Samples
Winter March 2023	9	30 samples	48 Samples	66 samples
Spring June 2023	2	--	7 samples	65 samples
Total	**26**	**50 samples**	**135 samples**	**252 samples**

Field efforts to acquire and sort recycling samples at Reuter Recycling and C&D samples at the BCL were successful (the actual number of samples met or exceeded the planned number of samples); however, meeting the Bulky Waste and MSW sampling goals was challenging. The North Broward Transfer Station's safety rules prevented outside contractors (such as SCS) from being near the tipping floor area; hence SCS was not able to observe bulky waste deliveries to the site. Additionally, a strong storm in June 2023 resulted in suspending fieldwork at the North Broward Transfer Station because strong winds made the site unsafe for sorting operations. Subsequent site flooding limited the site's ability to support our fieldwork; this resulted in just seven samples out of the planned 22 samples that could be acquired and sorted during that field effort. The other three seasonal field efforts were able to acquire and sort the targeted number of samples.

3.3 FIELD PROCEDURES

3.3.1 Source-Separated Recyclables

Reuter Recycling in Pembroke Pines, owned and operated by Waste Management, Inc., processes most of the recyclable material generated in Broward County. Recyclable materials are direct-hauled to the Deerfield Beach Recycling and Transfer facility where they are aggregated and transported via transfer trailer to Reuter Recycling. Recyclable materials from both residential and commercial sources are combined prior to delivery to Reuter Recycling. SCS staff coordinated with Reuter Recycling staff each day to confirm that the targeted transfer trailers contained recyclable material collected in Broward County only.

Field procedures for sampling and sorting recyclables are described in detail in Appendix B. Below is a summary of the sampling and sorting process at Reuter Recycling:

Sample Screening

SCS coordinated with staff from Reuter Recycling who coordinated with staff from the Deerfield Beach Recycling and Transfer facility to create transfer trailer loads of recyclables that were generated exclusively in Broward County. Reuter Recycling receives and processes recyclables from both inside and outside Broward County; hence, Reuter Recycling staff communicated the number of

transfer trailer loads of recyclables generated exclusively in Broward County that would be delivered each day. Between one and three transfer trailers were sampled each day.

Sample Acquisition

SCS staff directed a heavy equipment operator (provided by Reuter Recycling) to scoop recycling samples from random locations of the targeted discharged transfer trailer loads. Samples were aggregated in a designated area until the sorting crew was able to hand sort them.

Sample Sorting

Procedures for sorting samples of recyclable materials were the same as the procedures for sorting MSW. Staff from Reuter Recycling routinely conduct their own sampling and sorting program to assess contamination, and they were able to offer the use of their sorting table, which was permanently affixed to the floor in their facility. The sorting table was about four feet by eight feet and about eight inches deep, constructed of metal with a mesh bottom through which fine material passed into removable containers below the table. This material was weighed for each sample and documented as residue as the facility does not process and market material that small.

Exhibit 6. Photos of Recycling Sampling and Sorting

Transfer Trailer Load of Discharged Recyclables

Recycling Samples in Queue

Closer Look at Transfer Trailer Load of Discharged Recyclables

Loader Conveying Recycling Samples Into Holding Container

Field Team Sorting Recycling Sample

Field Team Sorting Recycling Sample

Source-Separated Recyclable Material Categories

Table 2 presents the material categories into which the source-separated recyclable material samples were sorted.

Table 2. Source-Separated Recyclable (SSR) Material Categories

SSR Material Category		Examples
Recyclable Fiber	Aseptic Cartons	Plastic- or wax-coated containers, milk & juice cartons
	Corrugated Cardboard	Packing or shipping boxes
	Magazines	Glossy or higher-grade paper magazines/catalogs
	Mixed Paper	Envelopes, junk mail, construction paper, wrapping paper
	Newspaper	Newspapers, coated newspaper inserts, newsprint
	Office Paper	White or colored printing/copier paper, file folders
Recyclable Plastic	#1 PET Bottles	Rigid clear or colored bottles for soda, mouthwash, juice, water, etc.
	#2 HDPE Color Containers	Opaque white or colored bottles for milk, juice, syrups, cleaning products, etc.
	#2 HDPE Natural Containers	Translucent containers for shampoos, detergents, milk, juice, syrup, etc.
	Other Mixed Plastic Containers	Rigid containers/bottles numbered #3, #4, #5, or #7
Recyclable Glass	Glass Containers	Colored or clear glass containers or bottles
Recyclable Metal	Aluminum Cans	Soda and beer cans
	Steel Cans	Ferrous food, beverage, and non-hazardous aerosol cans
Contaminant	Grocery Store Bags	Grocery store bags
	Plastic Film	Thin plastic wrap or food packaging
	Polystyrene	Food packaging (clamshells), cups, packing peanuts, CD cases with #6
	Residue	Other non-recyclable contamination

3.3.2 Municipal Solid Waste (MSW)

SCS follows American Society of Testing and Measurement (ASTM) Method Number D5231-92(2016), "Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste" for acquiring representative waste samples and manually sorting the waste samples into material types. The ASTM method outlines equipment needed, potential hazards, calibration of the scale(s) used to weigh sorted materials, suggested material types for sorting procedures, documentation of sorting container tare weights, selection of waste samples, and sorting procedures.

The methods described below reflect the ASTM method.

Waste Load Screening

Win Waste assigned a staff member to target waste loads and coordinate with heavy equipment operators to gather waste samples. SCS instructed the Win Waste staff member on targeting waste loads that were appropriate for this study. SCS staff worked with the Win Waste staff to record information about the targeted waste loads such as hauler name, origin/location of the materials, and generating sector (residential or commercial) of the materials. If the vehicle driver indicated the material was mixed from multiple generators (i.e., residential and commercial waste mixed together or material generated outside Broward County) the Win Waste staff member was instructed to reject the load.

A few times, the driver of the targeted load indicated to the Win Waste staff member that their waste load was residential. The Win Waste staff member proceeded to direct a heavy equipment operator to grab a random sample and deliver it to the sorting crew. Upon inspection of the sample, SCS staff found the waste was commercial and therefore rejected the sample. This happened less than five times over the course of the study.

Waste loads were targeted throughout each sample day so that a variety of sectors (residential and commercial) and originating communities were sampled.

Sample Acquisition

Once a waste load had been selected for sampling, the Win Waste staff member (with direction from SCS staff) directed a heavy equipment operator to scoop up a waste sample from a random area of the discharged pile. In general, a loader with a one cubic yard bucket/scoop is sufficient. SCS staff placed each sample in holding containers and weighed the materials until approximately 220 pounds had been obtained. This protocol aligns with the ASTM standard for the characterization of unprocessed municipal solid waste.

Sample Sorting

Sorting of waste samples was led by an experienced SCS Sorting Manager with the support of a six-person sort crew. Fundamental to this task is a consistent, methodical, statistically-valid sorting program that was repeated for each waste sample. The Sorting Manager supervised the entire sorting process and was actively conducting quality control measures to make sure materials were sorted and weighed properly. Each member of the sort crew was assigned a select material group for sorting (i.e., fiber categories, plastic categories, etc.). This practice generally improves the efficiency and accuracy of the sorting process because sort staff specialize and become experts in sorting the materials they are assigned. The basic procedures and objectives for sorting were identical for each sample as described in the systematic approach in **Appendix B**.

Exhibit 7. Photos of MSW Sampling and Sorting

Pre-Sorted Sample

Field Team Sorting MSW Sample

Field Team Sorting MSW Sample

Field Team Sorting MSW Sample

Pre-Weighed MSW Samples in Queue

Golf Clubs in MSW Sample

Medicine in MSW Sample
(medicine remained in containers to avoid hazards to sorters)

Waste samples were maintained in as-disposed conditions. Proper site layout and close supervision of sampling avoided the need to handle waste samples multiple times. Prior to fieldwork, each container to be used in the sorting process was noted with its tare weight which was also used when determining the gross weight of materials sorted.

MSW Material Categories

Table 3 presents the material categories into which the MSW samples will be sorted.

Table 3. MSW Material Categories

MSW Material Category		Examples
Fiber	Aseptic Cartons	Plastic- or wax-coated containers, milk & juice cartons, take-out boxes
	Compostable Paper	Food-contaminated paper towels, napkins
	Corrugated Cardboard	Packing or shipping boxes
	Magazines	Glossy or higher-grade paper magazines/catalogs
	Mixed Paper	Envelopes, junk mail, construction paper, wrapping paper
	Newspaper	Daily/weekly newspapers, coated newspaper inserts, newsprint
	Office Paper	White or colored printing/copier paper, file folders
Plastics	#1 PET Bottles	Rigid clear or colored bottles for soda, mouthwash, juice, water, etc.
	#2 HDPE Color Containers	Opaque white or colored bottles for milk, juice, syrups, cleaning products, etc.
	#2 HDPE Natural Containers	Translucent containers for shampoos, detergents, automobile fluids, milk, juice, syrup, etc.
	Grocery Store Bags	Grocery store bags
	Other Mixed Plastic Containers	Rigid containers/bottles numbered #3, #4, #5, or #7
	Plastic Films	Thin plastic wrap or food packaging (NO garbage bags)
	Polystyrene	Food packaging (clamshells), cups, packing peanuts, CD cases with #6
	Rigid Plastics	Hard plastic toys, outdoor chairs, large containers
	Shrink Wrap	Film plastic typically used to wrap pallets or bulk items
Glass	Glass Containers	Colored or clear glass containers or bottles
Metal	Aluminum Cans	Soda and beer cans
	Ferrous Metals	Steel and bi-metal scraps such as wire coat hangers, nails, screws, auto parts, and other magnetic items
	Non-Ferrous Metals	Aluminum pans, scraps; brass, copper, or other alloys not containing iron
	Steel Cans	Ferrous food, beverage, and non-hazardous aerosol cans

MSW Material Category		Examples
Organic	Food Waste	Food scraps, rotten food, meat, fruit, vegetables, etc.
	Other Organic (Wood)	Furniture such as couches, wooden tables or chairs, cabinets, shelves
	Other Uncategorized	Commingled waste/scraps, otherwise not categorized
	Textiles	Clothing, linens, leather, blankets, curtains, rubber. Includes natural and synthetic fibers
	Yard Trash	Grass, leaves, brush, sticks and twigs
Bulky/C&D	Asphalt Paving	Broken chunks of asphalt
	Asphalt Roofing	Asphalt shingles
	Brick	Clay or limestone bricks for masonry, walls, pavements
	Bulky Waste	Bulky materials that do not fit other categories
	Carpet & Carpet Padding	Carpets and rugs, padding & non-slip grips
	Clean Engineered Wood	Wooden boards, pallets
	Concrete	Cinderblocks, concrete chunks/debris
	Gypsum Board/Drywall	Drywall chunks/debris, sheetrock
	Insulation	Mineral wool, fiberglass, natural fiber insulation
	Mattresses/Box springs	Mattresses/mattress materials & box springs
	Other Metal	Other metal scraps non-categorized
	PVC Pipe	Thermoplastic resin commonly used for manufacturing sewage pipes, water mains and irrigation
	Rebar	Reinforcing steel bars
	Rock	Stones, pebbles, slate, gravel
	Treated Wood	Stained or painted wood
	White Goods	Large electrical appliances such as refrigerators, washing machines, microwaves
Other	Garbage Bags	Plastic bags used to contain garbage
	HHW	Compact fluorescent lightbulbs, fluorescent tubes, household cleaners, medical waste
	Miscellaneous	Not classified elsewhere
	Special	Household batteries, electronics, latex paint
	Tires	Automobile, bicycle, wheelbarrow, or other tires

3.3.3 Construction & Demolition Debris (C&D) and Bulky Waste

The Broward County Landfill (BCL) is a Class III landfill which does not accept MSW but receives a significant amount of C&D and bulky waste materials. All materials are delivered by the generator as BCL does not accept waste from franchised haulers providing municipal bulk waste collection services. BCL only accepts waste generated in Broward County, which is utilized by many businesses and residents located throughout the County.

Due to the heavy and bulky nature of most materials contained in C&D and bulk waste loads, acquiring a representative sample is not feasible due to the heavy nature of materials such as concrete, rock, and asphalt and the bulky nature of other items such as white goods and furniture. For the same reasons, sorting by hand is also not feasible. Therefore, C&D and bulky waste loads are visually characterized by volume and later converted to weight using published volume-to-weight conversion factors.

Sample Screening

SCS designated a C&D and bulky waste characterization manager who selected loads to screen and visually characterize. C&D and bulky loads were characterized as they arrived at the landfill throughout the day each season. The SCS professional walked around the entire pile (when safe to do so) and noted the materials present and the volume represented in the waste load. Estimated volumes were converted to weights using volume-to-weight conversion factors published by the US Environmental Protection Agency.

Waste Load Characterization

Visual characterization methods for C&D and Bulky Waste loads were developed by the California Integrated Waste Management Board. Once the selected load is dumped, the visual estimator performs the following steps.

- **Step 1: Measure load volume.** After the driver dumps the load onto the ground, the visual estimator estimates the length, width, and height of the load and records the information on the visual sample form.

- **Step 2: Note which material classes and materials are present.** The visual estimator walks entirely around the load and indicates on the visual sample form which materials and material classes are present in the load.

- **Step 3: Estimate composition by volume for each material class.** Beginning with the largest material class present by volume, the visual estimator then estimates the volumetric percentage of this material class and records it on the form. This process is repeated for the next most common material class, and so forth, until the volume percentage of every material class has been estimated.

- **Step 4: Check and reconcile percentage data.** The visual estimator then verifies that the percentage estimates for the material classes add up to 100 percent.

Exhibit 8. Photos of Select C&D and Bulky Loads

Example C&D/Bulky Waste Load

Example C&D/Bulky Waste Load

Example C&D/Bulky Waste Load

C&D and Bulky Waste Material Categories

Table 4 presents the material categories into which the C&D and Bulky Waste vehicle loads are visually characterized.

Table 4. C&D/Bulky Self-Haul Material Categories

C&D/Bulky Material Category		Examples
Fiber	Corrugated Cardboard	Packing or shipping boxes
Plastics	Plastic Film	Thin plastic wrap or food packaging (NO garbage bags)
	PVC Pipe	Thermoplastic resin commonly used for manufacturing sewage pipes, water mains and irrigation
	Rigid Plastics	Hard plastic toys, outdoor chairs, large containers
Wood	Clean Engineered Wood	Wooden boards, pallets
	Other Wood	Furniture such as couches, wooden tables or chairs, cabinets, shelves
	Treated Wood	Stained or painted wood
Metal	Ferrous Metals	Wire coat hangers, nails, screws, auto parts, and other magnetic items
	Non-Ferrous Metals	Aluminum cans, pans, scraps; brass, copper, or other
	Other Metal	Other metal scraps non-categorized
	Rebar	Reinforcing steel bars
	White Goods	Large electrical appliances such as refrigerators, washing
Textiles	Carpet & Carpet Padding	Carpets and rugs, padding & non-slip grips
	Furniture	Couches, chairs, dining tables, etc.
	Mattresses/box springs	Mattresses/mattress materials and box springs
	Textiles	Clothing, linens, leather, synthetic fibers, blankets, rubber
Organic	Food Waste	Food scraps, rotten food, meat, fruit, vegetables, etc.
	Yard Trash	Grass, leaves, brush, sticks and twigs
General	Asphalt Paving	Broken chunks of asphalt
	Asphalt Roofing	Asphalt shingles
	Brick	Clay or limestone bricks for masonry, walls, pavements
	Concrete	Cinderblocks, concrete chunks/debris
	Gypsum Board	Drywall chunks/debris, sheetrock
	Insulation	Mineral wool, fiberglass, natural fiber insulation
	Rock	Stones, pebbles, slate, gravel
Special	HHW	Compact fluorescent lightbulbs, fluorescent tubes, household cleaners, medical waste
	Special	Household batteries, electronics, latex paint
	Tires	Automobile, bicycle, wheelbarrow, or other tires
Other	Bulky Waste	Bulky materials that do not fit other categories
	Miscellaneous or Bagged MSW	Commingled waste/scraps, otherwise not categorized

3.4 DATA REDUCTION AND ANALYSIS

3.4.1 Waste Composition by Waste Type

MSW and Recycling

Upon completion of each seasonal field activity the data obtained was processed as follows:

1. Data was reviewed twice for accuracy and completeness; once at the conclusion of each day in the field and a second time prior to transcribing the data electronically.

2. Data was entered into a customized database (MS Excel) to facilitate processing.

3. Standard statistical analysis was completed to calculate the mean composition (percent), standard error, and confidence intervals at the ninety percent (90%) confidence level for each material stream, material category, generating sector, and the County as a whole. Mean composition for each sample was calculated using the ratio of the material's weight to the total sample weight.

4. Individual sample data was aggregated to calculate profiles for the following material streams and generating sectors: residential MSW, commercial MSW, recyclable materials, and C&D.

Waste samples are acquired to estimate the true waste composition of the waste stream (i.e., the proportion of each material present in waste collected by the County). The mean is the arithmetic average of all samples, and the standard deviation is a measure of the dispersion in the samples. Together, the mean and standard deviation determine the confidence interval. A 90 percent confidence interval is said to contain the true proportion of a waste component with 90 percent confidence (i.e., similar studies will produce the same results 90 percent of the time).

C&D and Bulky Waste

For C&D and bulky waste loads, the volumetric proportions of materials comprising selected waste loads were recorded. Using volume-to-weight conversion factors, the volumetric proportions identified in each waste load were converted to weight by material type. The material type weights for each waste load were summed for all sampled waste loads and divided by the summed total weight of all sampled waste loads to derive a compositional summary of C&D and bulky waste. These summarized compositional summaries are presented in Section 4.

3.4.2 Divertibility Analysis

Each of the 17 recycling material types, 46 MSW material types, and 30 C&D and Bulky Waste material types were classified into one of four divertibility groups:

- **Recyclable Materials -** This includes materials that are currently recycled in Broward County, have a market, and can be placed into residential curbside recycling bins.
- **Compostable Materials -** This includes organic materials that can be separated from MSW and composted.
- **Potentially Divertible -** This includes materials for which there are programs to collect these materials that avoid landfill disposal such as HHW, electronics, and textiles. It also includes

some C&D materials that could be diverted through specialized recycling programs such as concrete and asphalt paving.

- **Other Materials** - This includes materials that do not fit any of the definitions above and that are not easily diverted from landfill disposal.

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4 RESULTS

This section describes the data analysis performed on the data collected for each seasonal field activity along with the profiles for each of the material streams analyzed for this study.

4.1 MATERIAL CHARACTERIZATION PROFILES

SCS prepared material characterization profiles based on the data obtained during seasonal field activities. The material characterization profiles are listed and defined as follows:

1) **Source Separated Recycling –** Recyclable materials separated from garbage at the household and business level and placed in a separate cart for collection curbside.

2) **Residential MSW –** Residential garbage collected curbside from single-family homes in various communities in Broward County. Garbage may be collected directly by the municipality or by private haulers.

3) **Commercial MSW –** Commercial garbage collected onsite from businesses, including office buildings, grocery stores, restaurants, and other light industrial type businesses. In general, garbage is collected by private haulers.

4) **C&D/Bulky –** Large or bulky waste items generated from construction and demolition projects or residential or commercial clean-outs that are transported by a third-party hauler or self-hauled to the Broward County Landfill.

The material characterization profiles provided in this section are organized as follows:

- **Circle Graphs** – Circle graphs are used to show the material types that comprise the recyclable, compostable (if applicable), potentially divertible, and non-divertible classifications.

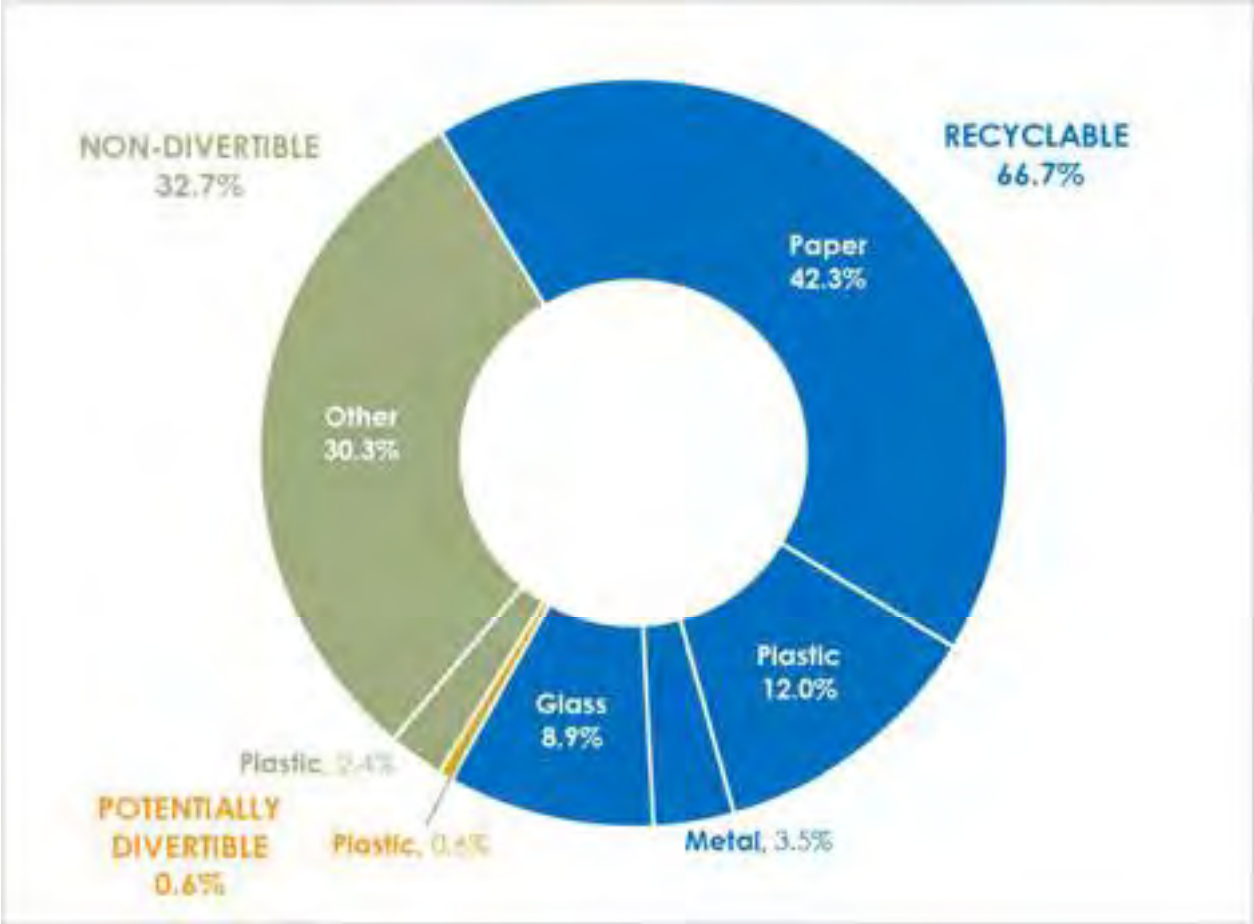
- **Tables** – Detailed tables provide the percentages for all specific materials sorted and measured for each material stream. The tables also include the calculated standard deviations and 90 percent confidence intervals for each material.

Data provided in the circle graphs and tables in this report are overall composition results. The data for each material stream was aggregated from each of the seasonal field activities completed for this study.

4.1.1 Source-Separated Recycling

Fifty samples of source separated recycling, comprising 8,376 pounds, were acquired and sorted over two seasonal field efforts into 17 material types. About 67 percent of the recycling stream consists of materials that are accepted for recycling programs in the County, including cardboard, newspaper, #1 and #2 plastic containers, metal cans, and glass bottles. The remaining 33 percent of the recyclable material stream are materials that are not accepted for recycling and have been classified as either potentially divertible (about one percent) and non-divertible (about 32 percent). **Exhibit 9** and **Table 5** provide the detailed breakdown of the composition of the recycling stream in Broward County.

Exhibit 9. Residential Recyclables Stream Classification by Material Type



Percentages may not add up to 100% due to rounding. Composition is based on 50 200-pound samples.

Non-divertible waste materials considered "residue" or "contamination" comprise 32.7 percent of recyclable materials collected. As presented in **Table 5**, materials that comprise the largest proportions of residential curbside recycling include:

- Corrugated Cardboard at 19.2 percent (recyclable)
- Mixed Paper at 11.6 percent (recyclable)
- Glass Containers at 8.9 percent (recyclable)
- PET Bottles at 5.8 percent (recyclable)
- Magazines at 4.7 percent (recyclable)

Table 5. Detailed Recyclable Materials Composition

MATERIAL		Mean Composition	Standard Deviation	Confidence Limits Lower	Confidence Limits Upper
RECYCLABLE					
Fiber	Corrugated Cardboard	19.2%	7.4%	17.5%	21.0%
	Mixed Paper	11.6%	2.7%	11.0%	12.3%
	Magazines	4.7%	2.6%	4.1%	5.3%
	Newspaper	3.1%	3.9%	2.1%	4.0%
	Office Paper	3.1%	1.7%	2.7%	3.5%
	Aseptic Containers	0.6%	0.3%	0.5%	0.7%
Plastic	#1 PET Bottles	5.8%	1.2%	5.5%	6.1%
	Other Mixed Plastic Containers	3.3%	1.6%	3.0%	3.7%
	#2 HDPE Colored Containers	1.8%	0.8%	1.6%	2.0%
	#2 HDPE Natural Containers	1.1%	0.6%	0.9%	1.2%
Metal	Steel Cans	1.8%	1.1%	1.5%	2.1%
	Aluminum Cans	1.7%	0.4%	1.6%	1.8%
Glass	Glass Containers	8.9%	3.6%	8.1%	9.8%
	Total Recyclable	**66.7%**			
POTENTIALLY DIVERTIBLE					
Plastic	Shopping Bags	0.6%	1.3%	0.3%	0.9%
	Total Potentially Divertible	**0.6%**			
NON-DIVERTIBLE					
Plastic	Plastic Films	2.0%	0.7%	1.8%	2.1%
	Expanded Polystyrene (Styrofoam)	0.4%	0.5%	0.3%	0.6%
Other	Residue	30.3%	7.9%	28.4%	32.1%
	Total Non-Divertible	**32.7%**			
TOTAL		**100.0%**			

Percentages may not add up to 100% due to rounding. Composition is based on 50 200-pound samples.

4.1.2 Residential MSW

91 samples of residential MSW, comprising 20,134 pounds, were acquired and sorted over four seasonal field efforts into 46 material types. About 31 percent of the residential MSW material stream is comprised of recyclable materials that could be diverted through existing programs. Another 35 percent of residential MSW is compostable, which includes food scraps that comprise 16 percent. The remaining composition includes about 13 percent potentially divertible materials and 22 percent non-divertible (**Exhibit 10** and **Table 6**).

Exhibit 10. Residential MSW Classification by Material Type

Percentages may not add to 100% due to rounding. Composition is based on 91 200-pound samples.

As presented in **Table 6**, materials that comprise the largest proportions of residential MSW include:

- Food Waste at 16.3 percent (compostable)
- Yard Waste at 14.1 percent (compostable)
- Miscellaneous materials (not classified) at 13.3 percent (non-divertible)
- Mixed Paper at 8.9 percent (recyclable)
- Textiles at 5.7 percent (potentially divertible)

Table 6. Detailed Residential MSW Composition

MATERIAL		Mean Composition	Standard Deviation	Confidence Limits Lower	Confidence Limits Upper
RECYCLABLE					
Fiber	Mixed Paper	8.9%	3.9%	8.2%	9.5%
	Corrugated Cardboard	4.5%	5.5%	3.6%	5.5%
	Office Paper	1.6%	2.6%	1.2%	2.1%
	Newspaper	0.9%	1.6%	0.6%	1.1%
	Magazines	0.8%	2.0%	0.4%	1.1%
	Aseptic Containers	0.3%	0.2%	0.2%	0.3%
Plastic	Other Mixed Plastic Containers	2.6%	1.1%	2.4%	2.7%
	#1 PET Bottles	2.5%	1.6%	2.2%	2.8%
	#2 HDPE Colored Containers	0.7%	0.7%	0.6%	0.8%
	#2 HDPE Natural Containers	0.3%	0.4%	0.3%	0.4%
Metal	Ferrous Metals	1.7%	3.0%	1.2%	2.2%
	Steel Cans	1.1%	1.1%	0.9%	1.3%
	Aluminum Cans	0.8%	0.5%	0.7%	0.9%
	Non-Ferrous Metals	0.5%	0.7%	0.4%	0.7%
Glass	Glass Containers	3.4%	2.5%	3.0%	3.9%
	Total Recyclable	**30.5%**			
COMPOSTABLE					
Paper	Compostable Paper	4.2%	2.2%	3.8%	4.6%
Organic	Food Waste	16.3%	10.2%	14.5%	18.0%
	Yard Trash	14.1%	13.1%	11.8%	16.4%
	Total Compostable	**34.6%**			
POTENTIALLY DIVERTIBLE					
Plastic	Rigid Plastics	1.6%	2.1%	1.2%	1.9%
	Grocery Store Bags	1.6%	0.8%	1.4%	1.7%
	Shrink Wrap	<0.1%	0.2%	<0.1%	0.1%
Organic	Textiles	5.7%	4.7%	4.9%	6.5%
	Other Organic (wood)	0.2%	0.8%	<0.1%	0.3%

Detailed Residential MSW Composition (continued)

MATERIAL		Mean Composition	Standard Deviation	Confidence Limits Lower	Confidence Limits Upper
POTENTIALLY DIVERTIBLE (continued)					
Construction & Demolition	Rock	1.7%	6.5%	0.6%	2.9%
	Concrete	0.4%	1.7%	0.1%	0.7%
	Carpet/Carpet Padding	0.4%	1.3%	0.1%	0.6%
	White Goods	0.2%	1.8%	<0.1%	0.5%
	Clean Engineered Wood	0.2%	0.6%	<0.1%	0.3%
	Other Metal	0.1%	1.0%	<0.1%	0.3%
	Gypsum Board/Drywall	0.1%	0.6%	<0.1%	0.2%
	Mattresses/Box Springs	<0.1%	0.2%	<0.1%	0.1%
	Brick	<0.1%	0.2%	<0.1%	0.1%
	PVC Pipe	<0.1%	0.1%	<0.1%	0.0%
	Asphalt Roofing	<0.1%	0.0%	<0.1%	0.0%
	Asphalt Paving	<0.1%	0.0%	<0.1%	0.0%
	Rebar	<0.1%	0.0%	<0.1%	0.0%
Other	Special Waste	1.2%	2.2%	0.8%	1.5%
	HHW	<0.1%	0.3%	<0.1%	0.1%
	Tires	<0.1%	0.0%	<0.1%	0.0%
	Total Potentially Divertible	**13.4%**			
NON-DIVERTIBLE					
Plastic	Plastic Films	3.7%	2.3%	3.3%	4.0%
	Garbage Bags	1.5%	0.9%	1.4%	1.7%
	Expanded Polystyrene (Styrofoam)	1.0%	0.5%	0.9%	1.0%
Organic	Other Uncategorized	0.9%	3.2%	0.3%	1.4%
Construction & Demolition	Treated Wood	1.1%	1.8%	0.8%	1.4%
	Bulky Waste	<0.1%	0.7%	<0.1%	0.2%
	Insulation	<0.1%	0.2%	<0.1%	0.1%
Other	Miscellaneous	13.3%	8.2%	11.9%	14.7%
	Total Non-Divertible	**21.5%**			
TOTAL		**100.0%**			

Percentages may not add to 100% due to rounding. Composition is based on 91 200-pound samples.

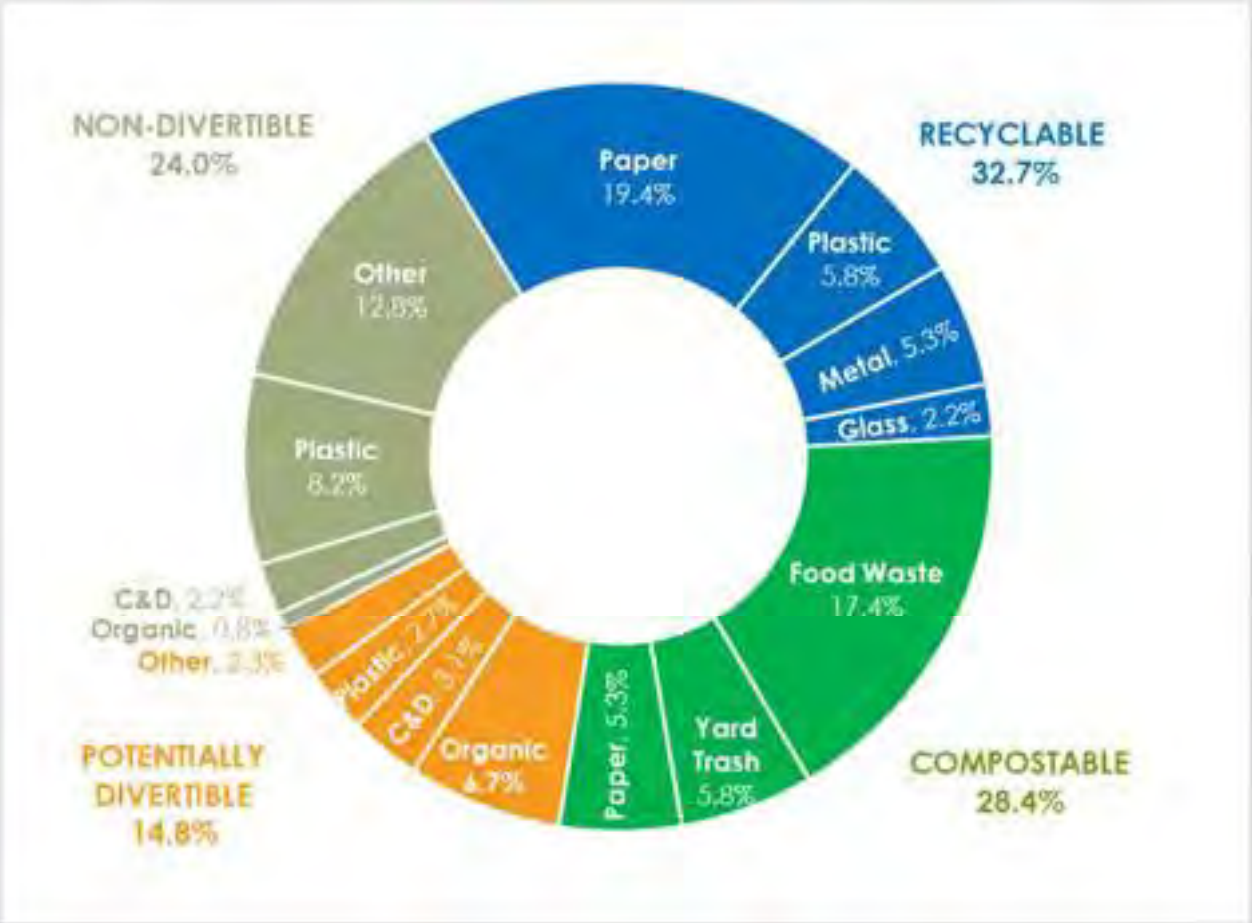
Residential MSW samples were acquired from the following cities:

- Margate – 16 samples
- Tamarac – 16 samples
- North Lauderdale – 15 samples
- Coral Springs – 11 samples
- Coconut Creek – 9 samples
- Lighthouse Point – 9 samples
- Davie – 7 samples
- Lauderdale Lakes – 6 samples
- Lauderhill – 2 samples

4.1.3 Commercial MSW

44 samples of commercial MSW, comprising 9,868 pounds, were acquired and sorted over four seasonal field efforts into 46 material types. About 33 percent of the commercial MSW material stream consists of recyclable materials that could be diverted through existing programs. Another 28 percent of commercial MSW is compostable, which includes food scraps that comprise 17 percent. The remaining composition includes about 15 percent potentially divertible materials and 24 percent non-divertible (**Exhibit 11** and **Table 7**).

Exhibit 11. Commercial MSW Classification by Material Type



Percentages may not add up to 100% due to rounding. Composition is based on 44 200-pound samples.

As presented in **Table 7**, materials that comprise the largest proportions of commercial MSW include:

- Food Waste at 17.4 percent (compostable)
- Miscellaneous materials (not classified) at 12.8 percent (non-divertible)
- Corrugated Cardboard at 8.7 percent (recyclable)
- Mixed Paper at 6.9 percent (recyclable)
- Yard Trash at 5.8 percent (compostable)

Table 7. Detailed Commercial MSW Composition

MATERIAL		Mean Composition	Standard Deviation	Confidence Limits Lower	Confidence Limits Upper
RECYCLABLE					
Fiber	Corrugated Cardboard	8.7%	6.0%	7.2%	10.2%
	Mixed Paper	6.9%	3.8%	5.9%	7.8%
	Office Paper	1.9%	3.2%	1.1%	2.7%
	Magazines	1.0%	2.4%	0.4%	1.6%
	Newspaper	0.5%	1.0%	0.3%	0.8%
	Aseptic Containers	0.4%	0.6%	0.2%	0.6%
Plastic	Other Mixed Plastic Containers	2.4%	1.5%	2.0%	2.7%
	#1 PET Bottles	2.3%	1.7%	1.9%	2.8%
	#2 HDPE Colored Containers	0.6%	0.8%	0.5%	0.8%
	#2 HDPE Natural Containers	0.4%	0.4%	0.3%	0.5%
Metal	Ferrous Metals	3.2%	7.0%	1.4%	4.9%
	Non-Ferrous Metals	0.8%	2.0%	0.3%	1.4%
	Aluminum Cans	0.7%	0.7%	0.6%	0.9%
	Steel Cans	0.6%	0.5%	0.4%	0.7%
Glass	Glass Containers	2.2%	2.0%	1.7%	2.7%
	Total Recyclable	**32.7%**			
COMPOSTABLE					
Paper	Compostable Paper	5.3%	4.7%	4.1%	6.4%
Organic	Food Waste	17.4%	10.6%	14.8%	20.0%
	Yard Trash	5.8%	9.5%	3.4%	8.1%
	Total Compostable	**28.4%**			
POTENTIALLY DIVERTIBLE					
Plastic	Rigid Plastics	1.5%	2.4%	1.0%	2.1%
	Grocery Store Bags	1.4%	1.2%	1.1%	1.7%
	Shrink Wrap	0.1%	0.5%	<0.1%	0.3%
Organic	Textiles	4.2%	4.6%	3.0%	5.3%
	Other Organic (wood)	2.5%	6.3%	0.9%	4.0%

Detailed Commercial MSW Composition (continued)

MATERIAL		Mean Composition	Standard Deviation	Confidence Limits Lower	Confidence Limits Upper
POTENTIALLY DIVERTIBLE (continued)					
Construction & Demolition	Concrete	1.1%	5.1%	<0.1%	2.4%
	Carpet/Carpet Padding	0.5%	2.4%	<0.1%	1.1%
	Mattresses/Box Springs	0.5%	2.1%	<0.1%	1.0%
	Clean Engineered Wood	0.1%	0.6%	<0.1%	0.3%
	Brick	<0.1%	0.3%	<0.1%	0.2%
	PVC Pipe	<0.1%	0.1%	<0.1%	0.0%
	Gypsum Board/Drywall	<0.1%	0.0%	<0.1%	0.0%
	Asphalt Roofing	<0.1%	0.0%	<0.1%	0.0%
	Asphalt Paving	<0.1%	0.0%	<0.1%	0.0%
	Other Metal	<0.1%	0.0%	<0.1%	0.0%
	Rebar	<0.1%	0.0%	<0.1%	0.0%
	Rock	<0.1%	0.0%	<0.1%	0.0%
	White Goods	<0.1%	0.0%	<0.1%	0.0%
Other	HHW	1.2%	7.9%	<0.1%	3.2%
	Special Waste	0.8%	1.3%	0.5%	1.1%
	Tires	0.8%	5.0%	<0.1%	2.0%
Total Potentially Divertible		**14.8%**			
NON-DIVERTIBLE					
Plastic	Plastic Films	5.1%	2.8%	4.4%	5.8%
	Garbage Bags	2.1%	1.4%	1.8%	2.5%
	Expanded Polystyrene (Styrofoam)	1.0%	1.2%	0.7%	1.3%
Organic	Other Uncategorized	0.8%	2.4%	0.2%	1.4%
Construction & Demolition	Treated Wood	2.1%	6.1%	0.6%	3.6%
	Bulky Waste	<0.1%	0.4%	<0.1%	0.1%
	Insulation	<0.1%	0.2%	<0.1%	0.1%
Other	Miscellaneous	12.8%	8.6%	10.7%	14.9%
Total Non-Divertible		**24.0%**			
TOTAL		**100.0%**			

Percentages may not add up to 100% due to rounding. Composition is based on 44 200-pound samples.

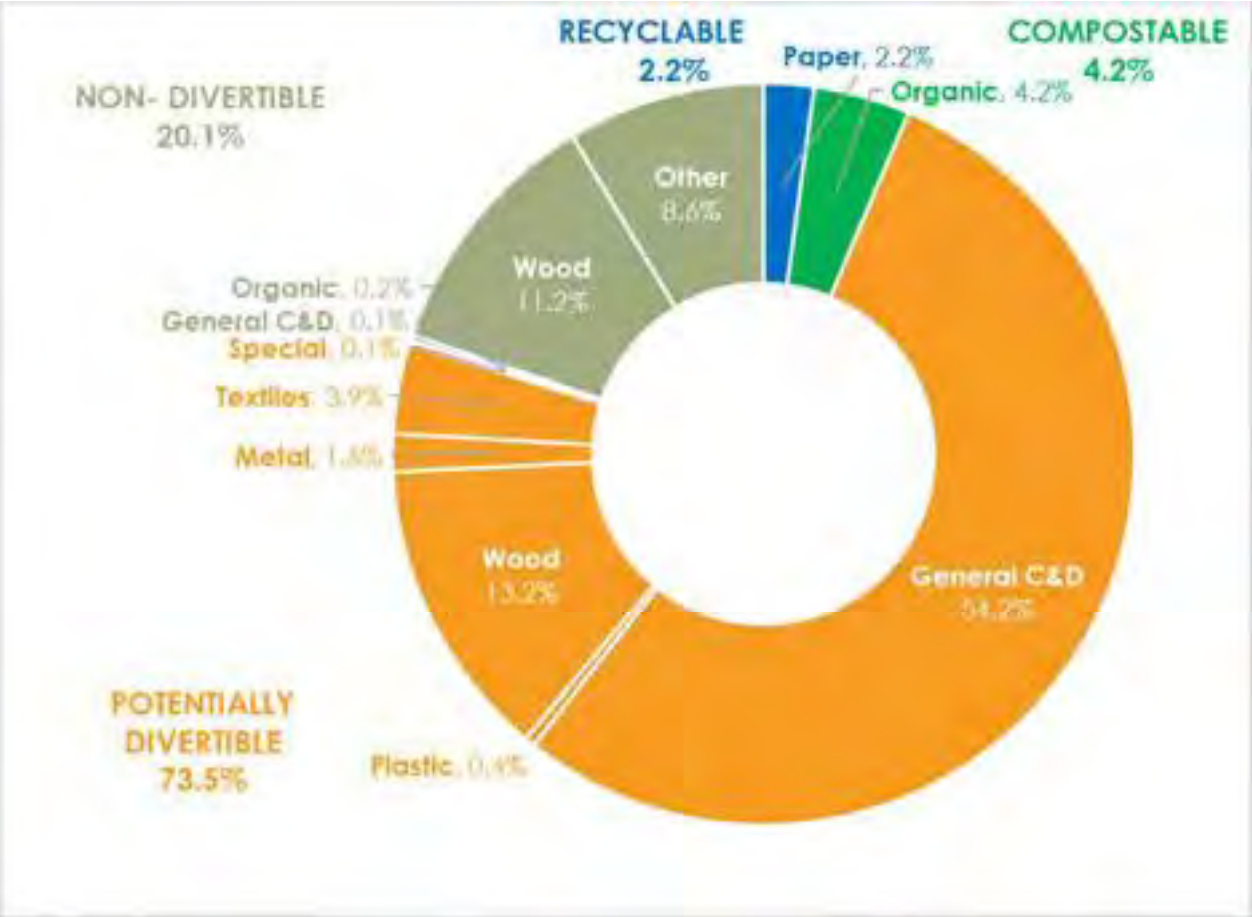
Commercial MSW samples were acquired from the following cities:

- Fort Lauderdale – 13 samples
- Tamarac – 8 samples
- Coconut Creek – 7 samples
- Coral Springs – 5 samples
- Margate – 4 samples
- North Lauderdale – 3 samples
- Davie – 2 samples
- Lauderdale Lakes – 2 samples

4.1.4 Construction and Demolition Debris/Bulky Waste

252 C&D and bulky waste loads were visually characterized over four seasonal field efforts into 30 material types. Nearly three-quarters of the disposed C&D/bulky waste material stream is classified as potentially divertible, which includes items such as concrete, brick, asphalt roofing, wood, and textiles. SCS estimated about two percent of this material stream is recyclable cardboard and four percent is organic material, primarily yard waste. The remaining 20 percent is classified as non-divertible and includes items such as treated wood, bagged waste, bulky waste, and insulation. **Exhibit 6** and **Table 9** provide the detailed breakdown of the composition of the C&D/bulky waste stream in Broward County.

Exhibit 12. C&D/Bulky Waste Classification by Material Type



Percentages may not add up to 100% due to rounding. Composition is based on 252 visually characterized waste loads

As presented in **Table 8**, materials that comprise the largest proportions of C&D/Bulky Waste include:

- Asphalt Roofing at 25.7 percent (potentially divertible)
- Clean Engineered Wood at 13.2 percent (potentially divertible)
- Treated Wood at 11.2 percent (non-divertible)
- Brick at 8.8 percent (potentially divertible)
- Concrete at 8.0 percent (potentially divertible

Table 8. Detailed C&D/Bulky Waste Composition

MATERIAL		Mean Composition
RECYCLABLE		
Fiber	Cardboard	2.2%
	Total Recyclable	**2.2%**
COMPOSTABLE		
Organic	Yard Trash	3.9%
	Food Waste	0.3%
	Total Compostable	**4.2%**
POTENTIALLY DIVERTIBLE		
General C&D	Asphalt Roofing	25.7%
	Brick	8.8%
	Concrete	8.0%
	Gypsum Board/Drywall	7.3%
	Rock	2.8%
	Asphalt Paving	1.6%
Plastic	Rigid Plastics	0.4%
Wood	Clean Engineered Wood	13.2%
Metal	Non-Ferrous Metals	0.8%
	Ferrous Metals	0.5%
	White Goods	0.3%
	Rebar	<0.1%
	Other Metal	<0.1%
Textiles	Furniture	1.9%
	Carpet/Carpet Padding	1.2%
	Mattresses/Box Springs	0.8%
	Textiles	<0.1%
Special	Tires	<0.1%
	Special Waste	<0.1%
	HHW	<0.1%
	Total Potentially Divertible	**73.5%**
NON-DIVERTIBLE		
General C&D	Insulation	0.1%
Plastic	PVC Pipe	<0.1%
	Plastic Films	0.1%
Wood	Treated Wood	11.2%
	Other Wood	<0.1%
Other	Miscellaneous / Bagged Waste	8.2%
	Bulky Waste	0.4%
	Total Non-Divertible	**20.1%**
TOTAL		**100.0%**

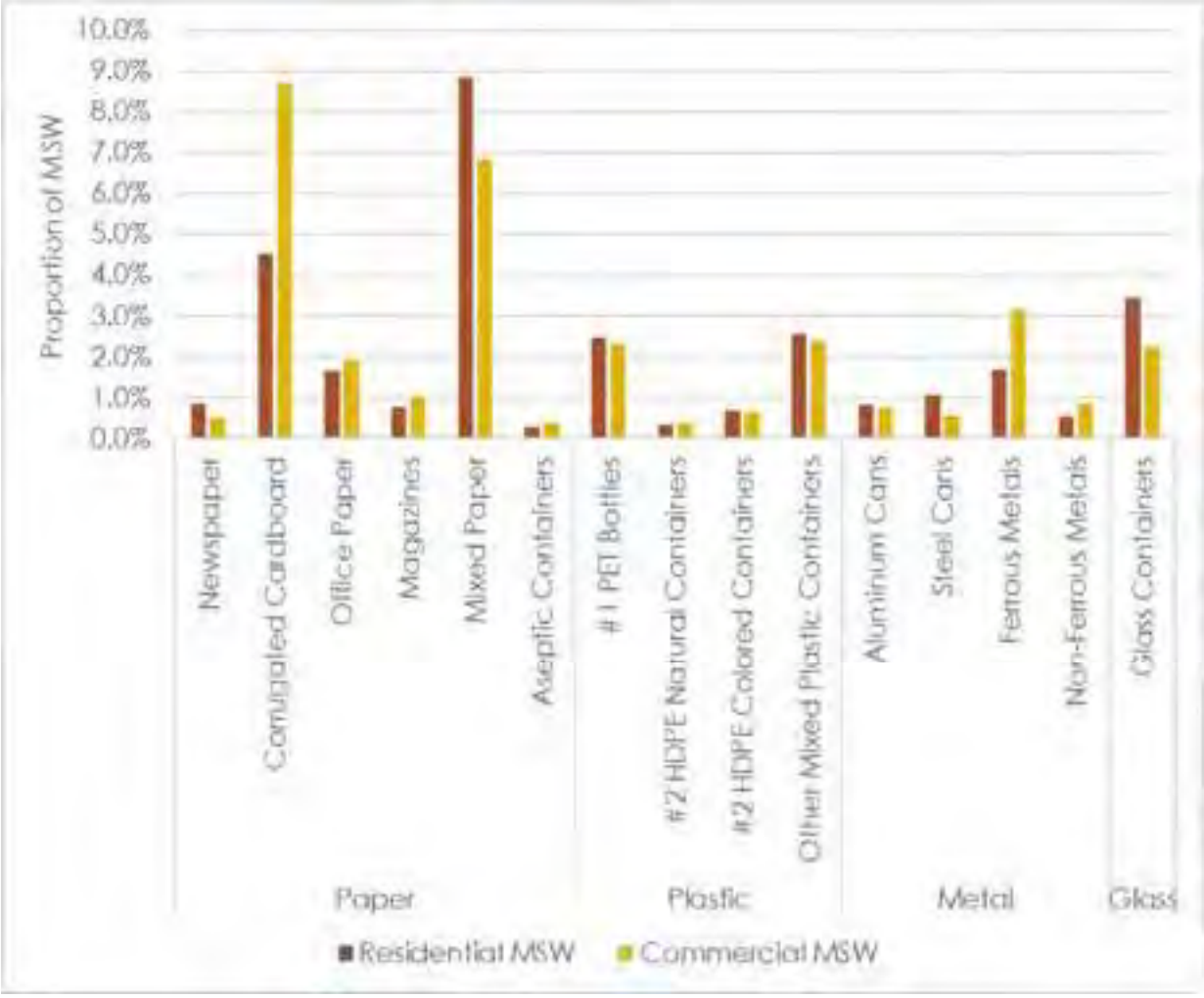
Percentages may not add up to 100% due to rounding.
Composition is based on 252 visually characterized waste loads.

4.2 FINDINGS

Residential vs Commercial MSW

Identifying differences between residential and commercial MSW can help pinpoint and develop targeted outreach and education efforts. Statistically significant differences are identified when the 90-percent confidence intervals do not overlap. **Exhibit 13** presents the proportions of recyclable materials for both residential and commercial MSW.

Exhibit 13. Recyclable Materials in MSW – Comparison of Residential vs Commercial



Commercial MSW has higher proportions of the following materials with statistical significance:

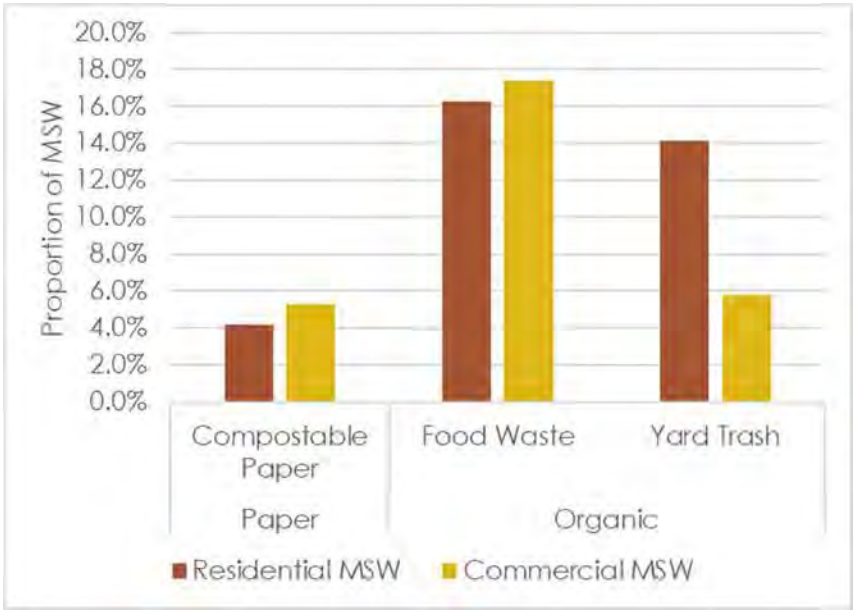
- Corrugated Cardboard (8.7 percent in commercial MSW vs 4.5 percent in residential MSW).

Residential MSW has higher proportions of the following materials with statistical significance:

- Mixed Paper (8.9 percent in residential MSW vs 6.9 percent in commercial MSW)
- Steel Cans (1.1 percent in residential MSW vs 0.6 percent in commercial MSW)
- Glass Containers (3.4 percent in residential MSW vs 2.2 percent in commercial MSW)

Exhibit 14 presents the proportions of compostable materials for both residential and commercial MSW.

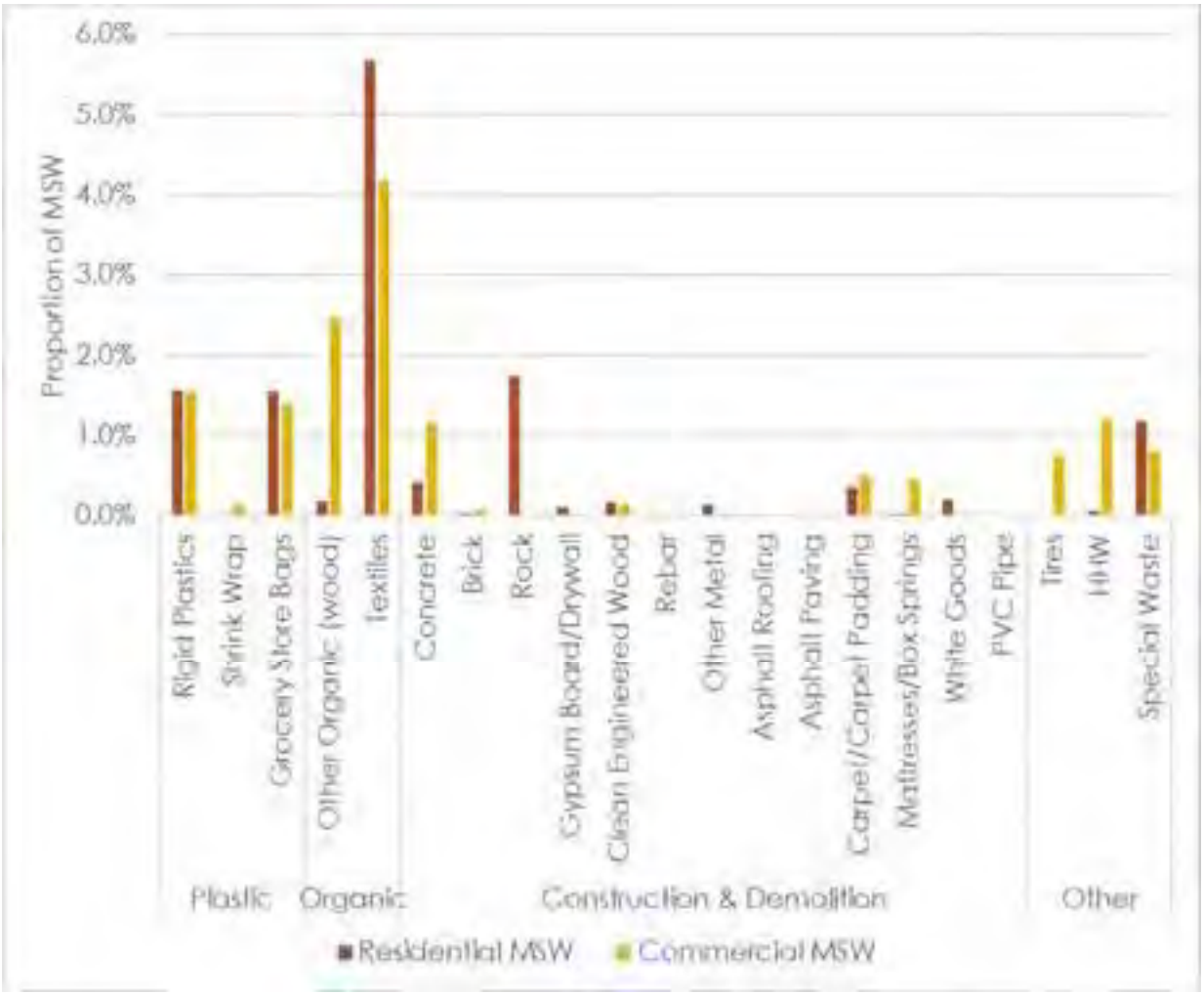
Exhibit 14. Compostable Materials in MSW – Comparison of Residential vs Commercial



Residential MSW has higher proportions of Yard Trash (14.1 percent in residential MSW vs 5.8 percent in commercial MSW).

Exhibit 15 presents the proportions of potentially divertible materials for both residential and commercial MSW.

Exhibit 15. Potentially Divertible Materials in MSW
Comparison of Residential vs Commercial



Textiles in both residential and commercial MSW represent a significant opportunity for waste diversion.

Divertibility Comparison

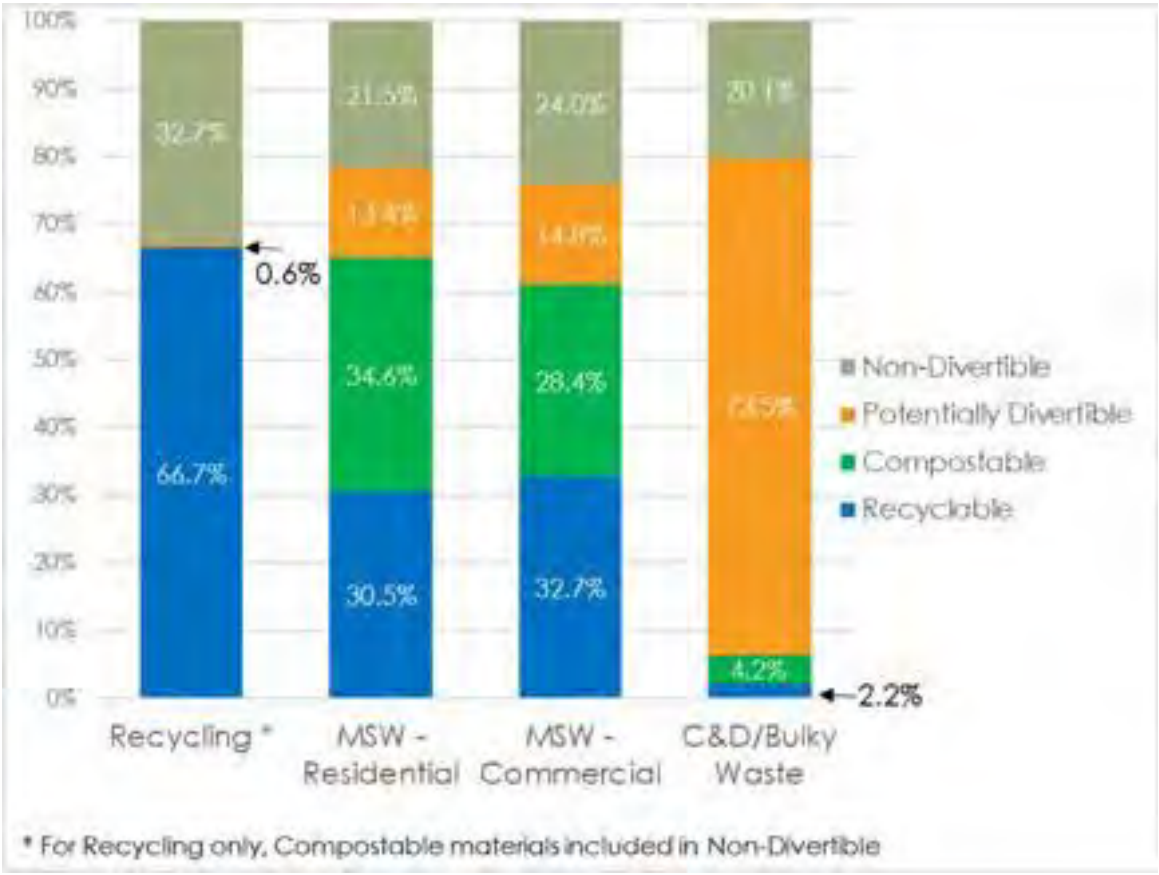
Exhibit 16 presents a comparison of waste streams generated and characterized according to divertibility:

- Residential curbside recycling contamination (non-divertible materials that should not be placed in the recycling cart) represents about one third (32.7 percent) of recyclable materials. High contamination rates result in higher processing costs since the technology is designed for processing acceptable materials. Increased education and communication could reduce the level of contamination.

- Residential and commercial MSW have similar compositions with about 76 to 78.5 percent of the waste stream being divertible. Commercial waste has slightly more recyclable materials and potentially divertible materials. Residential waste has more compostable materials.

- Much of the C&D/Bulky Waste stream is potentially divertible with Asphalt Roofing comprising 25.7 percent, Clean Engineered Wood representing 13.2 percent, and Brick representing 8.8 percent.

Exhibit 16. Divertibility Comparison by Stream



5 CONCLUSIONS AND RECOMMENDATIONS

This study provides data and information about the various waste streams in Broward County to evaluate the effectiveness of existing waste diversion programs and identify opportunities to create programs or develop facilities to divert additional materials from landfill disposal or incineration. Comparison of future waste compositions to the waste compositions in this report can also help identify trends and changes in waste generation in the County.

The following recommendations are based on the waste composition data presented in this report:

1. **Improving Existing Recycling Behavior:** By weight, 30.5 percent of residential MSW and about one third of materials set aside for recycling are not recyclable in Broward County. Non-recyclable materials that are placed into recycling collection containers are called contamination. Types of contamination are variable and include soiled/wet paper, plastic and metal containers that still contain food, appliances, plastic bags, and yard trash, among others. In 2018, China enacted its National Sword Policies which prohibit shipments of contaminated recyclables from outside the country. While additional recycling processing capacity is being developed in the U.S., the technology to separate single-stream recyclable materials into marketable commodities is not designed to handle significant contamination. Public education and outreach should inform residents and businesses about proper recycling.

2. **Reduce the Amount of Recyclable Material Disposed as MSW:** By weight, 30.5 of the County's residential MSW and 32.7 percent of commercial MSW are recyclable materials. This represents a lost opportunity to conserve resources, receive revenue from the sale of recyclable commodities, and reduce greenhouse gas emissions from disposal and mining for virgin materials. Cardboard and mixed paper comprise the largest portions of recyclable materials in MSW.

3. **Focus on Diverting Compostable Materials**: Compostable materials (compostable paper, food, and yard trash) comprise 34.6 percent of residential MSW and 28.4 percent of commercial MSW. There is significantly more yard trash in residential MSW than commercial MSW. Nationwide, there continues to be growing interest in diverting materials for composting and other organic processing technologies. The opportunity for diverting compostable materials in Broward County is tremendous, and the County should further assess programs, facilities, and technologies for processing organics.

4. **Develop Programs to Divert C&D/Bulky Waste:** About 80 percent of C&D/Bulky waste is recyclable (cardboard), compostable, or potentially divertible. The County should assess markets for recovered C&D materials in the region and could work with contractors and self-haulers to separate materials that could be recovered. Asphalt roofing, clean engineered wood, concrete and brick comprise the greatest portions of C&D/Bulky waste. The BCL also could develop holding areas for divertible materials and then transport them to a processor when sufficient quantities accumulate. This could promote waste diversion and reduce the financial burden on small contractors and self-haulers to recycle.

5. **Continue Performing Waste Characterization Studies:** Over the last two decades, waste characterization studies have provided local governments with valuable information on how the waste stream is changing. This allows governments to make decisions on the programs and policies needed to reduce disposal, recover resources, and boost the economy. The County should continue conducting these studies on an incremental basis to further track changes in the waste stream.

Appendix A
Health & Safety Plans

North Broward Transfer Station
Owned by Waste Management
Operated by Win Waste

Site-Specific Health and Safety Plan
Win Waste North Broward Transfer Station

Broward County
Waste Characterization Study
September 15, 2022

REQUIRED APPROVAL			
SCS OSHC or designee:	John Jones	Date:	September 15, 2022
SCS PM:	Stacey Demers	Date:	September 15, 2022

Project No.:	09222033.00 Tasks 701, 702, 703, 704
Project Name:	Broward Co Waste Characterization Study
Site Address:	2600 Wiles Road, Coconut Creek (Pompano Beach), FL 33073
Client Contact:	Davin Siewrattan

EMERGENCY TELEPHONE NUMBERS	
Fire:	911 or (954) 764-4357 (non emergency)
Police:	911 or (954) 764-4357 (non-emergency)
Hospital	(954) 341-8300 Broward Health North Emergency Room
Ambulance:	911
WorkCare Service for SCS Employees	1-800-455-6155
The directions and information on the nearest hospital are found on Page **3.**	

ACKNOWLEDGEMENT PAGE

"I have read the attached Health and Safety Plan for the Waste Characterization Study. I have discussed any questions and/or concerns that I have regarding the contents of this document with the designated SCS project safety representative, and I understand its requirements.

Name	Signature	Company	Date

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Attachments

Attachment 1 – Job Task Safety Analysis and PPE Assessment Form

1 INTRODUCTION

At SCS, protection of human health and the environment is paramount. This Site-Specific Health and Safety Plan (SSHSP) provides information to identify hazards that may be present and/or introduced by project's activities onto SCS job sites, and details needed precautions that employees should follow to protect themselves. Tasks performed on site or during projects should be analyzed to determine if physical or chemical hazards requiring safeguards or additional Personal Protective Equipment (PPE) exist. This plan will be modified as necessary if any new hazards are identified during the project that require that additional safeguards be put in place. This plan is in the draft stage, approval will be gained from the SCS Office Safety and Health Coordinator prior to any field activities.

PROJECT ORGANIZATION

On-site Health and Safety Representative:	Brent Dieleman Alexis Vento Katherine Hinojosa	202-841-9827
Project Manager:	Stacey Demers	703-929-2986
Client Representative:	Davin Siewrattan	954-581-6606 ext 212

SCOPE OF WORK – WASTE CHARACTERIZATION

Material characterization involves collecting field samples and sorting the municipal solid waste into designated categories.

Accidents may occur due to the potential hazards associated with the presence of heavy equipment at the site, the components of the waste itself (potentially sharp objects, broken glass), climatic conditions, trips and falls from stairs in the MRF, and carelessness. At transfer stations and landfills, combustion of the waste materials on the tipping floor or in "Hot Loads" from refuse vehicles can present potential hazards.

The presence of heavy equipment in operation at the site (end loaders, graders, transfer station compactors, garbage trucks, etc.) presents potential hazards which can be avoided with the use of general common sense and staying visible. The equipment operators generally are involved in performing their tasks and may be unaware of the presence of other individuals within the immediate area. Personnel will be trained to be aware of the movement and location of equipment at all times. Also, highly visible clothing, including safety vests and hard hats, is required.

The components of municipal solid waste (and MRF residuals) present potential physical hazards. These include, but are not limited to, cuts from broken glass and sharp metal objects; splinters from pieces of wood; punctures from nails and other sharp objects; and scrapes and

abrasions from the general handling of the solid waste. There also exists the potential for exposure to household products, such as bleach, cleansers, and other toxic chemicals.

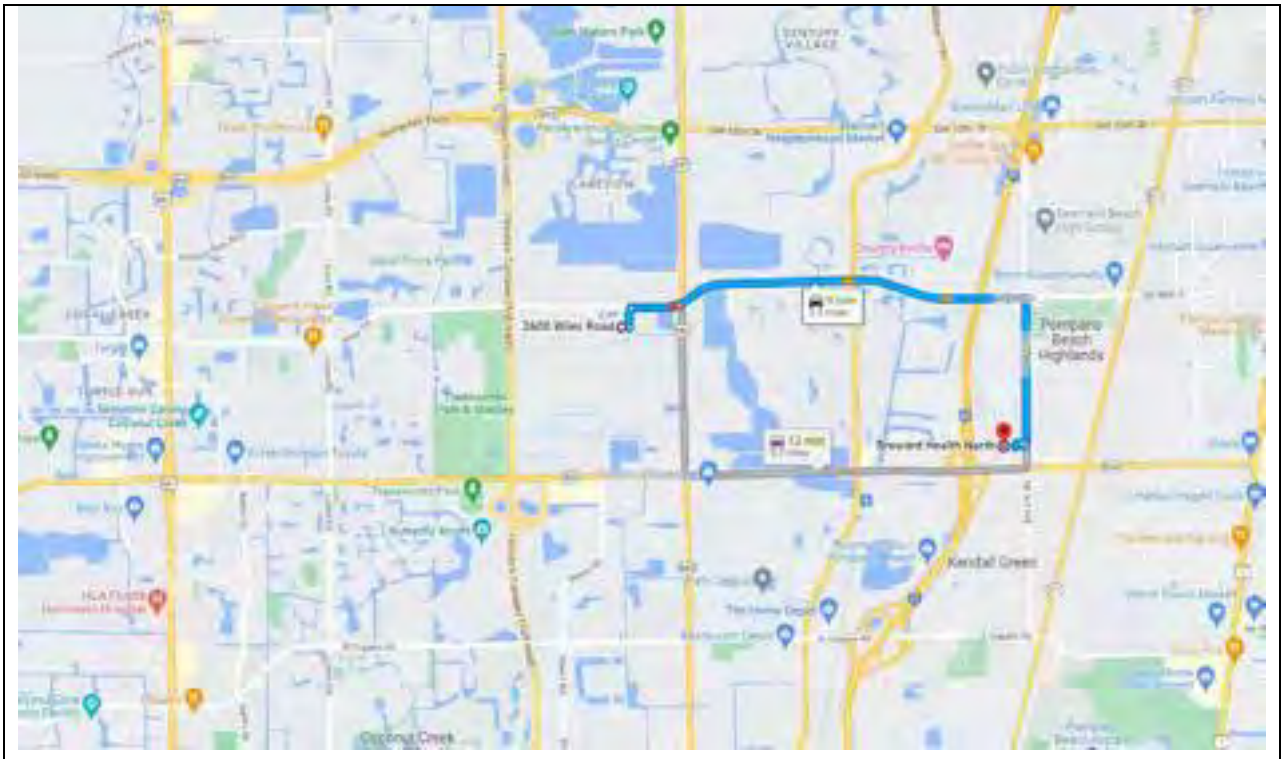
To alleviate the possibility of injury, caution should be employed at all times when physically handling the solid waste. Protective clothing, including gloves and safety glasses, should be worn at all times. If there is any question about the handling of a component of solid waste, the Crew Chief should be notified.

Caution should be taken to avoid the possibility of heat stress due to protective clothing or weather.

Materials deposited at the site can pose a potential fire hazard. Fires can be started through carelessness, sparks, or from "Hot Loads" handled at the refuse facilities. If fire or smoke is observed, site personnel should be notified immediately, all SCS personnel and subcontractors should leave the immediate area at once, and the local emergency fire department should be notified.

2 EMERGENCY RESPONSE AND MEDICAL TREATMENT PROCEDURES

EMERGENCY CONTACT AND NOTIFICATION INFORMATION



1. Head north toward NW 48th St/Wiles Rd
2. Turn right onto NW 48th St/Wiles Rd
3. Continue onto NW 49th Ct/Green Rd (follow Green Rd)
4. Continue onto NW 48th St
5. Turn right onto NE 3rd Ave
6. Turn right after in 194 feet
7. Turn left in 325 feet

Figure 1. Map to the Hospital and Directions

Broward Health North Hospital – Emergency Room
201 E. Sample Rd, Pompano Beach, FL 33064
954-941-8300

ACCIDENT OR INCIDENT REPORTING SYSTEM

In the event of an emergency at the site, project personnel should call 911 for emergency assistance. After the immediate emergency situation has been addressed by emergency personnel, SCS project personnel should call the SCS Project Manager and the Client Representative and inform them of the situation. The Project Manager should evaluate the nature of the emergency and direct project personnel actions from that point.

NOTIFICATION PROCEDURES FOR INCIDENTS (CLIENT, LOCAL, STATE, OR FEDERAL)

Site personnel should contact their supervisor immediately when an accident or injury occurs, and provide any needed information so that additional notifications can be determined and completed as needed.

METHODS TO SUMMON EMERGENCY RESPONSE TEAM

Emergency services can be summoned through 911, as this service is active in the area.

RESCUE AND MEDICAL TREATMENT REQUIREMENTS

Stop work authority should be exercised when an injury or accident occurs. The appropriate emergency agency should be contacted and first aid administered, if possible. If the injury is not life-threatening and does not require emergency response, contact WorkCare (SCS health advice service) at (800) 455-6155. First aid kits and fire extinguishers are available in each SCS work truck.

3 SITE DESCRIPTION

LOCATION DESCRIPTION

The facility is located at 20701 Pembroke Road, Pembroke Pines, FL 33029.

4 GENERAL FIELD SAFETY PROCEDURES

General Standard Operating Procedures (SOPs) and additional SCS Health and Safety procedures and requirements are included in the current SCS Injury Illness Protection Program (IIPP) and on the SCS intranet. These documents are considered a part of this plan.

SCS team members will conduct themselves in a professional manner at all times. The following restrictions will also be observed by all SCS personnel and subcontractors to SCS:

- Working while under the influence of intoxicants, narcotics, or controlled substances is prohibited.
- Smoking anywhere on site is prohibited.

- Loose clothing will not be worn on-site. Long hair will be worn up inside hard hat.

- Eating, drinking, chewing gum, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited on-site, unless in designated break areas.

- No personnel will be admitted to the site without the proper safety equipment, clearance or other approval.

- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the Site Manager, will be immediately dismissed from the site.

- No unapproved work clothes or equipment will be allowed on-site.

- Prescription drugs should not be taken by personnel where the potential for contact with toxic substances exist. Use must be specifically approved by a qualified physician.

- Work areas for various operational activities will be established.

- Work areas will be established based on prevailing site conditions and are subject to change. Personnel should check with the SCS Site Manager for current and appropriate procedures regularly.

- Contact with contaminated or potentially contaminated material should be avoided. Whenever possible, do not walk through puddles, mud, or any discolored ground surface. Do not kneel on the ground. Do not lean, sit or place equipment on drums, containers, or vehicles.

- Due caution will be observed when proceeding on foot through open areas. Personnel will not cross the line of cones that will separate the sorting area from the area where heavy equipment will be operating.

- Any medical emergency supersedes routine safety requirements.

APPLICABLE STANDARD OPERATING PROCEDURES (SOPS) AND PROGRAMS

The following SOPs are incorporated by reference and available on the SCS intranet.

	SOP Number and Name		SOP Number and Name
X	01 - General Code of Safe Work Practices		22 - Safe Procedures for Working with Sites That Contain Hydrogen Sulfide
X	04 - JTSA and PPE Assessment Procedures	X	24 - Avoidance of Slips, Trips, and Falls
	05 - Work Permits	X	25 - Avoidance and Prevention of Heat and Cold Stress, and Other Weather-Related Hazards
X	06 - Forklift and Heavy Machinery Operations		26 - All-Terrain Vehicles and Watercraft
X	07 - Compressed Air and Compressed Gas Cylinders		27 - OSHA and Other Regulatory Inspections
	08 - Drilling and Well Installation Procedures		
	09 - Electrical Safety		**Appendix Letter and Program Name**
	10 - Fall Protection	X	B - Hazard Communication
X	11 - Fire Extinguishers		C - HAZWOPER
	12 - Hand and Power Tools		D - Exposure Assessment
	13 - Working Safely with Ladders	X	E - PPE Other Than Respiratory Protection
	14 - Landfill Leachate and Condensate Safe Procedures	X	F - Respiratory Protection
	15 - Lockout and Tagout	X	G - Motor Vehicle and Fleet Safety
	17 - Materials Use and Handling		H - Hearing Conservation
	18 - Polyethylene (PE) Pipe Work Safe Procedures	X	I - Bloodborne Pathogens
X	19 - Site Sanitation Procedures		J - Excavation and Construction Earthwork Program
	20 - Safe Work Practices for Scaffolds		K - Confined Space Entry
X	21 - Safe Procedures for Biological Hazards (Snakes, Insects, Vegetation, Bacteria)		L - Ergonomics Program

JOB TASK SAFETY ANALYSIS (JTSA) AND PPE ASSESSMENT

JTSAs for activities performed at this site have been completed as indicated below and are included as **Attachment 1**. A completed JTSA is required for all work tasks performed at the site. JTSAs are designed to identify steps which involve potential hazards to employees and should be reviewed and understood (and signed providing evidence of understanding) before performing any task at the site. If additional steps or hazards are present, the JTSA should be revised (and the revision signed by all affected staff) to indicate that all items have been appropriately addressed and are understood before proceeding with the task.

Unless identified in an attached Job Task Safety Analysis (JTSA) form, all project tasks are anticipated to only require **Level D** PPE, as defined by the Occupational Safety and Health Administration (OSHA).

SCS field personnel (including subcontractors) will be informed in the use of safety equipment and will be required to wear protective clothing appropriate for the tasks in which they will be involved.

Extra equipment will be located on-site. This equipment will include the following items:

- Tyvek Coverall Suits
- Gloves (nitrile and HexArmor: SharpsMaster II)
- High Visibility Safety Vests
- Eye Protection
- Ear Protection
- Hard Hats
- First Aid Kit

SCS will provide sufficient water for personal use on-site daily.

OTHER INSPECTION PROCEDURES

Periodic site inspections may be made by the Project Supervisor, Project Manager, and Regional Compliance Auditor or Safety Specialist. There is also the potential for the client or regulatory agencies to visit and inspect the site. SCS personnel are to perform tasks in compliance with all contractual, regulatory, and company requirements at all times.

SITE CONTROL

SCS and its subcontractors will be restricted to the sorting area at the Site. A loader will be used to transfer waste samples from the bale area to the sorting area. **Under no circumstances will SCS employees or subcontractors enter unauthorized locations at the Materials Recovery Facility.**

Our clients are responsible for providing SCS employees with safe site access, which includes sites that are free of threats from transients or other aggressive people or animals. If an SCS employee encounters an aggressive person or animal, they should withdraw from the site and contact the Site Representative and their SCS supervisor. The Site Owner is responsible for removing the threats, and SCS employees should not take any affirmative action of their own.

DECONTAMINATION PROCEDURES

The risks of illness due to ingestion of diseased or decomposing materials from the work site are significant. To minimize these risks, all personnel should remove and store the outer layer of their protective clothing (i.e., coveralls, gloves, hard hat, etc.) on-site. Hands, face, and nails should be thoroughly washed, or scrubbed, with soap and water prior to engaging in any activity likely to transmit materials encountered on-site into the mouth. If waste materials come in contact with the skin, that crew member will be temporarily excused to thoroughly wash the affected area with soap and water.

HANDLING OF HAZARDOUS WASTE MATERIALS

Hazardous materials will be avoided during sample selection. If hazardous materials are encountered during the waste sorting activities, they will be segregated from the normal waste and recycling streams and put in separate containers.

Caution will be taken when handling mercury-containing wastes such as fluorescent light bulbs. Care will be taken to not break the glass bulb, and to avoid samples with excess amounts of fluorescent light bulbs. Gloves and Tyvek suits will provide skin protection from mercury compounds.

Extreme care will be taken when handling and disposing of hazardous materials. If subcontractors encounter any material that may be considered hazardous, they will be instructed to report it to the Site Manager immediately.

HOUSEKEEPING REQUIREMENTS

Hand sanitizer and soap will be made available to assist with decontamination. The designated break area is located in the front of the MRF.

5 SITE HAZARDS

Chemical and Physical Agent Hazards

The following chemical and physical hazards should be considered before performing any task or work at the site. The analysis will depend on a thorough understanding of the site's physical characteristics and the task(s) being performed.

Toxic Compounds: Non-Methane Organic Compounds (NMOCs), as well as inorganic toxic contaminants such as mercury, and sometimes even radioactive contaminants such as tritium, may be present on a site. NMOCs include such toxic compounds as benzene, toluene, chloroform, vinyl chloride, carbon tetrachloride, and trichloroethane, which, although commonly less than 1 percent by weight, are hazardous. These potential hazards should be evaluated on a case-by-case basis. Additional precautions will be established as needed.

Poisons: Pesticides, cleaners, or other toxic materials of various types may be present in the waste stream. Avoid contact with these items. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Flammables: Fuel such as gasoline and diesel may be present in the waste stream. Additionally, paint thinners or other flammable materials may be present in the waste. The primary risk associated with these materials is fire. Keep all ignition sources away from flammable materials. Do not smoke, unless in designated areas. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Oxidizers: Fertilizers, pool chemicals, chlorine, or other oxidizers may be present in the waste stream. These materials may be in use at water treatment plants or in the waste at the site. The primary risk from oxidizers is an increased fire potential. Keep fire and fuel or oil away from oxidizers. Do not smoke, unless in designated areas. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Corrosives: Acidic and caustic materials may be present in the waste stream. These materials may be in use at water treatment plants or in the waste at the site. The primary risk from corrosives is damage to the skin or eyes. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Physical Hazards

The following physical hazards should be considered before performing any task or work at the site. Depending on the task(s) being performed, any or all of these hazards may be present.

Heavy Equipment: Compactors, bull dozers, loaders, track hoes, forklifts and large trucks, and other vehicles are present at the MRF. Loud noise and limited visibility can increase the threat of being run over or crushed by these vehicles. Wear high-visibility vests (recommend Class III) and coordinate with vehicle operators when working in the vicinity of these pieces of equipment. Heavy equipment hazards are especially present at or near the tipping floor. When working in this area, equipment operators must be notified. The use of a second person (as a spotter) should be done when working in this area

Heat-Related Injuries: Elevated body temperatures can cause serious injury or death. Working outdoors or in the sun increases the chance of heat-related injuries. This hazard is especially critical when PPE (such as coveralls or rain gear) is worn, since heat from the body becomes trapped inside clothing. Personnel should drink plenty of liquids and take breaks as needed. The following describes the various effects of heat-related injuries.

Heat Disorders and Health Effects:

- **Heat Stroke:** This disorder occurs when the body's system of temperature regulation (e.g., sweating and evaporation) fails and body temperature rises to critical levels. The condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a serious hazard, however. Primary signs and symptoms are confusion, irrational behavior, loss of consciousness, convulsions, a lack of sweating (usually), hot, dry skin, and an abnormally high body temperature. If a worker shows signs of possible heat stroke, call 911 to obtain **immediate** medical assistance. The worker should be placed in a shady area, and his or her outer clothing should be removed. The worker's skin should also be wetted and air movement around the body increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible--by mouth only if the worker is conscious. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment. Regardless of the worker's protests, **no** employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

- **Heat Exhaustion:** The signs and symptoms of heat exhaustion include clammy skin, headache, nausea, vertigo, weakness, thirst, and giddiness. Fortunately, heat exhaustion responds readily to prompt treatment. This condition, however, should not be dismissed lightly, for several reasons. One is that fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended. The victim could also be injured when he or she faints. While the signs and symptoms associated with heat exhaustion are similar to those of heat stroke, the notable difference (with heat

exhaustion) is clammy skin. Workers suffering from heat exhaustion should be removed from hot environments and given fluid replacement, by mouth only if the workers are conscious. They should also be encouraged to get adequate rest.

- **Heat Rashes:** The most common problem occurring in hot work environments is heat rash. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, the papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and papules may become infected if they are not treated. In most cases, heat rash will disappear when the affected individual returns to a cool environment.

- **Heat Fatigue:** One factor that predisposes individuals to heat fatigue is the lack of acclimatization. Use of a program of acclimatization and training for work in hot environments are advisable. The signs and symptoms of heat fatigue include impaired performance of skilled sensorimotor, high-concentration, or high-vigilance activities. The sole treatment available for heat fatigue is to remove heat stress and increase fluid replacement before a more serious heat-related condition develops.

Biological Hazards

Rodents, poisonous insects, snakes, other animals and/or plants are a natural part of any ecosystem. They are sometimes difficult to eliminate or avoid on some sites because of the location. Employees should be aware of the potential for encountering these types of animals and plants. Where possible, nesting places should be removed or access to them should be limited. If several infestations occur, remedies should be discussed with a supervisor and the client (see **SCS IIPP, SOP-21**, for precautions and treatment for biological hazards). The following could be encountered in performance of the operation, maintenance, and monitoring functions of a project:

Hantavirus: Infection typically occurs by the inhalation of tiny airborne droplets of fresh or dried rodent excretions. Transmission to humans may also occur through direct contact with rodents or rodent-contaminated materials, and ingestion of contaminated food or water is also a possible route of transmission. Sweeping or "shaking out" rodent-contaminated materials should be avoided unless performed using respiratory protection. The early symptoms of hantavirus disease are flu-like (fever, chills, muscle aches). For a very short period of time, the infected person starts to feel better. Then, within 1 to 2 days, he or she may develop shortness of breath. The disease gets worse quickly and leads to respiratory failure, a condition known as Hantavirus Pulmonary Syndrome (HPS). About half of all HPS patients experience these symptoms, which usually occur 1 to 5 weeks from contracting the illness.

Bloodborn Pathogens: Human blood can contain harmful viruses such as the Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV). Contact with affected blood, as well as materials contaminated by this blood, can result in transmitting viruses and the life-threatening conditions they cause.

SCS has adopted a Bloodborne Pathogen Exposure Control Plan to protect employees who may come into contact with blood, or materials contaminated with blood, during the performance of

tasks. Although the program is intended to comply with OSHA's Bloodborne Pathogens Standard, 29 CFR 1910.1030, the primary purpose for adopting the plan is to help employees avoid bloodborne pathogens at work.

When an employee is involved in an exposure incident, it must be reported in accordance with the Health and Safety Injury and Illness Prevention Plan. All employees involved in an exposure incident will be offered post-exposure evaluation and follow-up, in accordance with the OSHA standard. Follow-up will include:

- Documentation of the route of exposure and the circumstances related to the incident.
- If possible, identification of the source individual and, if possible, the status of the source individual. The blood of the source individual will be tested (after consent is obtained) for HIV/HBV infectivity.
- Results of testing of the source individual will be made available to the exposed employee, along with applicable laws and regulations concerning disclosure of the identity and infectivity of the source individual.
- The employee will be offered the option of having blood collected for testing of that employee's HIV/HBV serological status. The blood sample will be preserved for at least 90 days to allow the employee to decide if the blood should be tested for HIV serological status. However, if the employee decides, prior to that time, that testing will be conducted, the appropriate action can be taken and the blood sample discarded.
- The employee will be offered post-exposure counseling in accordance with current recommendations of the U.S. Public Health Service.
- The employee will be given appropriate counseling concerning precautions to take during the period after the exposure incident. The employee will also be given information regarding potential illnesses and procedures for reporting related symptoms to appropriate personnel.

Attachment 1 – Job Task Safety Analysis and PPE Assessment Form

JOB TASK SAFETY ANALYSIS AND PPE ASSESSMENT FORM-
JTSA-ES- 16- WASTE SORT

Job Task Safety Analysis Form-01				
Task Type (Check all that Apply)	Solid Waste	**Task Description (include an estimate of task duration in hrs/day)** Five day waste sort, approximately 8 hours per day.		**Location or Project:** Reuter Recycling Facility of Florida, Pembroke Pines **Date Revised:** August 26, 2020 **Project #/Revision #:** 09222033.00
Analysis Team Member	**Position Title**		**Reviewed by**	**Position Title**
Stacey Demers	Project Director			
Brent Dieleman	Project Manager			
Alexis Vento	Staff Professional			
Katherine Hinojosa	Project Professional			
Special Training Required		Bloodborne pathogens training		
Applicable SAFE Checklist(s): Specify type and category number		Environmental Services/Solid Waste Checklist		

This form is the certification that the hazard assessment has been performed for the workplace as required by 29 CFR 1910.132.

CAM #26-0492
Exhibit 2
Page 621 of 1334

Job Task Step	Potential Environmental and Personnel Hazards[1]	Critical Actions	PPE Required
1. Drive to site, set up sorting table and containers.	Heavy lifting Slips/trips/falls Vehicle traffic	• Check in w/facility • Ensure work area is secured/isolated • Use buddy system • Employ safe lifting behaviors • Stretch/warm-up	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Leather outer glove Respiratory: None Hearing: None Eye/Face: Safety glasses
2. Collect solid waste samples from the tipping floor area	Heavy lifting Vehicle/HE traffic Slips/trips/falls Medical/bio waste Sharps Chemical exposures	• Use buddy system • Stay visible • Use safe lifting • Set up away from traffic • Give directions to bobcat operator • Avoid Heavy EQ traffic	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Puncture Resistant Gloves Respiratory: Dust mask Hearing: Earplugs Eye/Face: Safety glasses
3. Hand-sort solid waste materials on the sorting table. (At the MRF)	Heavy lifting Vehicle/HE traffic Slips/trips/falls Medical/bio waste Sharps Chemical exposures Stress/hygiene concerns	• Use buddy system • Stay visible • Use safe lifting • Set up away from traffic • Brush trash (vs digging) • Wash hands freq. • Stay hydrated • Shift breaks	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Puncture Resistant Gloves Respiratory: Dust mask (optional) Hearing: Earplugs (optional) Eye/Face: Safety glasses

CAM #26-0492
Exhibit 2
Page 622 of 1334

Job Task Step	Potential Environmental and Personnel Hazards[1]	Critical Actions	PPE Required
4. Cleanup and Decontaminate	Heavy lifting Slips/trips/falls Vehicle traffic	• Ensure work area is secured/isolated • Use buddy system • Employ safe lifting behaviors • Stretch/warm-up • Decontaminate PPE	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Leather outer glove Respiratory: Dust mask (optional) Hearing: None Eye/Face: Safety glasses
5. Demo	Vehicle/HE traffic	• Check out w/facility	Head: None Body: High Visibility Vest Foot: Steel--toe ANSI boots Hand: None Respiratory: None Hearing: None Eye/Face: None
End of JTSA Form			

CAM #26-0492
Exhibit 2
Page 623 of 1334

Appendix A (continued)
Health & Safety Plans

Reuter Recycling
Owned and Operated by Waste Management

Site-Specific Health and Safety Plan
Reuter Recycling of Florida

Broward County
Waste Characterization Study
August 29, 2022

REQUIRED APPROVAL			
SCS OSHC or designee:	John Jones	Date:	August 15, 2022
SCS PM:	Stacey Demers	Date:	August 15, 2022

Project No.:	09222033.00 Tasks 701 and 703
Project Name:	Broward Co Waste Characterization Study
Site Address:	20701 Pembroke Road, Pembroke Pines, FL 33029
Client Contact:	Kenny Caldararo

EMERGENCY TELEPHONE NUMBERS	
Fire:	911 or (954) 764-4357 (non emergency)
Police:	911 or (954) 764-4357 (non-emergency)
Hospital	(954) 538-5000 Memorial Healthcare System - Miramar
Ambulance:	911
WorkCare Service for SCS Employees	1-800-455-6155
The directions and information on the nearest hospital are found on Page **3.**	

ACKNOWLEDGEMENT PAGE

"I have read the attached Health and Safety Plan for the Waste Characterization Study. I have discussed any questions and/or concerns that I have regarding the contents of this document with the designated SCS project safety representative, and I understand its requirements.

Name	Signature	Company	Date

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Attachments

Attachment 1 – Job Task Safety Analysis and PPE Assessment Form

1 INTRODUCTION

At SCS, protection of human health and the environment is paramount. This Site-Specific Health and Safety Plan (SSHSP) provides information to identify hazards that may be present and/or introduced by project's activities onto SCS job sites, and details needed precautions that employees should follow to protect themselves. Tasks performed on site or during projects should be analyzed to determine if physical or chemical hazards requiring safeguards or additional Personal Protective Equipment (PPE) exist. This plan will be modified as necessary if any new hazards are identified during the project that require that additional safeguards be put in place. This plan is in the draft stage, approval will be gained from the SCS Office Safety and Health Coordinator prior to any field activities.

PROJECT ORGANIZATION

On-site Health and Safety Representative:	Brent Dieleman Alexis Vento Katherine Hinojosa	202-841-9827
Project Manager:	Stacey Demers	703-929-2986
Client Representative:	Kenny Caldararo	561-352-5334

SCOPE OF WORK – WASTE CHARACTERIZATION

Material characterization involves collecting field samples and sorting the municipal solid waste into designated categories.

Accidents may occur due to the potential hazards associated with the presence of heavy equipment at the site, the components of the waste itself (potentially sharp objects, broken glass), climatic conditions, trips and falls from stairs in the MRF, and carelessness. At transfer stations and landfills, combustion of the waste materials on the tipping floor or in "Hot Loads" from refuse vehicles can present potential hazards.

The presence of heavy equipment in operation at the site (end loaders, graders, transfer station compactors, garbage trucks, etc.) presents potential hazards which can be avoided with the use of general common sense and staying visible. The equipment operators generally are involved in performing their tasks and may be unaware of the presence of other individuals within the immediate area. Personnel will be trained to be aware of the movement and location of equipment at all times. Also, highly visible clothing, including safety vests and hard hats, is required.

The components of municipal solid waste (and MRF residuals) present potential physical hazards. These include, but are not limited to, cuts from broken glass and sharp metal objects; splinters from pieces of wood; punctures from nails and other sharp objects; and scrapes and abrasions from the general handling of the solid waste. There also exists the potential for exposure to household products, such as bleach, cleansers, and other toxic chemicals.

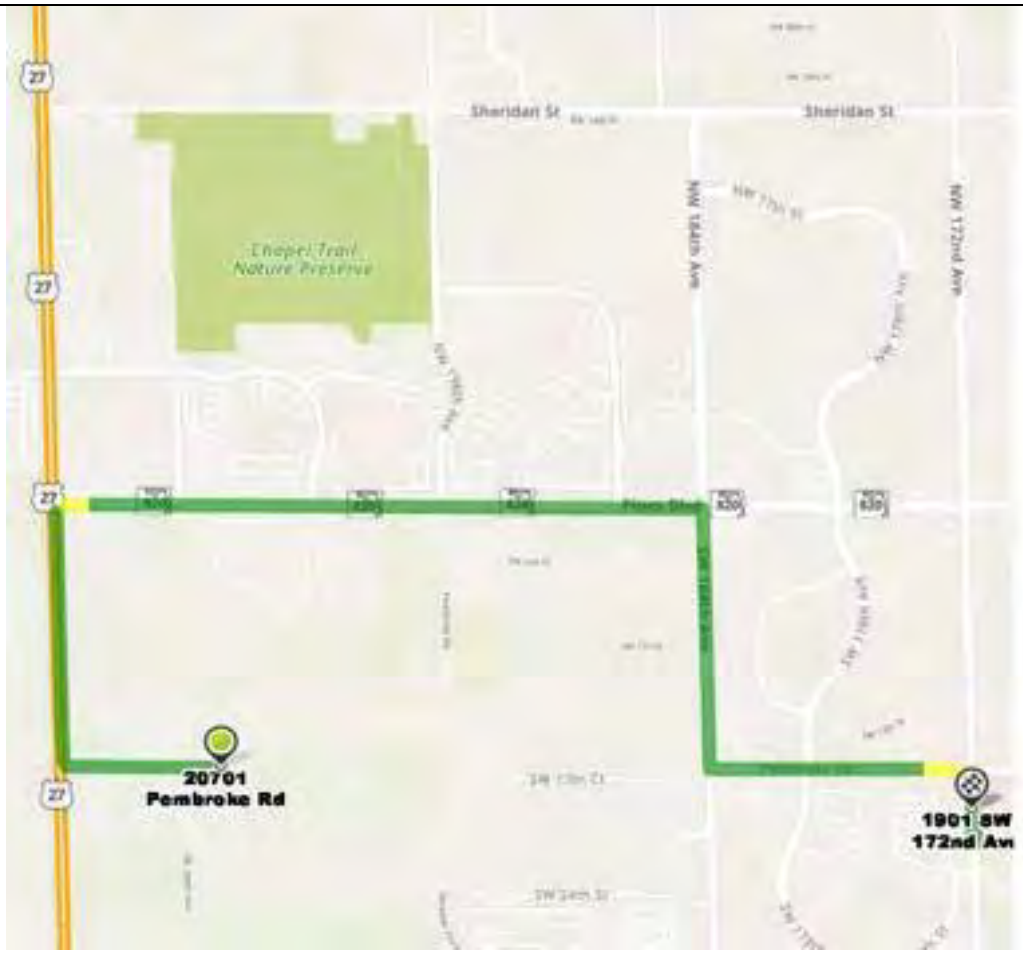
To alleviate the possibility of injury, caution should be employed at all times when physically handling the solid waste. Protective clothing, including gloves and safety glasses, should be worn at all times. If there is any question about the handling of a component of solid waste, the Crew Chief should be notified.

Caution should be taken to avoid the possibility of heat stress due to protective clothing or weather.

Materials deposited at the site can pose a potential fire hazard. Fires can be started through carelessness, sparks, or from "Hot Loads" handled at the refuse facilities. If fire or smoke is observed, site personnel should be notified immediately, all SCS personnel and subcontractors should leave the immediate area at once, and the local emergency fire department should be notified.

2 EMERGENCY RESPONSE AND MEDICAL TREATMENT PROCEDURES

EMERGENCY CONTACT AND NOTIFICATION INFORMATION



1. West on Pembroke Road Toward N 208th Ave
2. Turn 2nd right on US Highway 27 (N/FL-25)
3. Take 1st right onto Pines Blvd (FL-820).
4. Turn left onto Pembroke Rd
5. Turn right onto SW 172 Ave
6. Make a U-Turn onto SW 172 Ave
7. See Memorial Hospital on right

Figure 1. Map to the Hospital and Directions

Memorial Healthcare Hospital - Miramar
1901 SW 172 Ave, Miramar, FL 33029
954-538-5000

ACCIDENT OR INCIDENT REPORTING SYSTEM

In the event of an emergency at the site, project personnel should call 911 for emergency assistance. After the immediate emergency situation has been addressed by emergency personnel, SCS project personnel should call the SCS Project Manager and the Client Representative and inform them of the situation. The Project Manager should evaluate the nature of the emergency and direct project personnel actions from that point.

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Site personnel should contact their supervisor immediately when an accident or injury occurs, and provide any needed information so that additional notifications can be determined and completed as needed.

METHODS TO SUMMON EMERGENCY RESPONSE TEAM

Emergency services can be summoned through 911, as this service is active in the area.

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Stop work authority should be exercised when an injury or accident occurs. The appropriate emergency agency should be contacted and first aid administered, if possible. If the injury is not life-threatening and does not require emergency response, contact WorkCare (SCS health advice service) at (800) 455-6155. First aid kits and fire extinguishers are available in each SCS work truck.

3 SITE DESCRIPTION

LOCATION DESCRIPTION

The facility is located at 20701 Pembroke Road, Pembroke Pines, FL 33029.

4 GENERAL FIELD SAFETY PROCEDURES

General Standard Operating Procedures (SOPs) and additional SCS Health and Safety procedures and requirements are included in the current SCS Injury Illness Protection Program (IIPP) and on the SCS intranet. These documents are considered a part of this plan.

SCS team members will conduct themselves in a professional manner at all times. The following restrictions will also be observed by all SCS personnel and subcontractors to SCS:

- Working while under the influence of intoxicants, narcotics, or controlled substances is prohibited.

- Smoking anywhere on site is prohibited.

- Loose clothing will not be worn on-site. Long hair will be worn up inside hard hat.

- Eating, drinking, chewing gum, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited on-site, unless in designated break areas.

- No personnel will be admitted to the site without the proper safety equipment, clearance or other approval.

- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the Site Manager, will be immediately dismissed from the site.

- No unapproved work clothes or equipment will be allowed on-site.

- Prescription drugs should not be taken by personnel where the potential for contact with toxic substances exist. Use must be specifically approved by a qualified physician.

- Work areas for various operational activities will be established.

- Work areas will be established based on prevailing site conditions and are subject to change. Personnel should check with the SCS Site Manager for current and appropriate procedures regularly.

- Contact with contaminated or potentially contaminated material should be avoided. Whenever possible, do not walk through puddles, mud, or any discolored ground surface. Do not kneel on the ground. Do not lean, sit or place equipment on drums, containers, or vehicles.

- Due caution will be observed when proceeding on foot through open areas. Personnel will not cross the line of cones that will separate the sorting area from the area where heavy equipment will be operating.

- Any medical emergency supersedes routine safety requirements.

APPLICABLE STANDARD OPERATING PROCEDURES (SOPS) AND PROGRAMS

The following SOPs are incorporated by reference and available on the SCS intranet.

	SOP Number and Name		SOP Number and Name
X	01 - General Code of Safe Work Practices		22 - Safe Procedures for Working with Sites That Contain Hydrogen Sulfide
X	04 - JTSA and PPE Assessment Procedures	X	24 - Avoidance of Slips, Trips, and Falls
	05 - Work Permits	X	25 - Avoidance and Prevention of Heat and Cold Stress, and Other Weather-Related Hazards
X	06 - Forklift and Heavy Machinery Operations		26 - All-Terrain Vehicles and Watercraft
X	07 - Compressed Air and Compressed Gas Cylinders		27 - OSHA and Other Regulatory Inspections
	08 - Drilling and Well Installation Procedures		
	09 - Electrical Safety		**Appendix Letter and Program Name**
	10 - Fall Protection	X	B - Hazard Communication
X	11 - Fire Extinguishers		C - HAZWOPER
	12 - Hand and Power Tools		D - Exposure Assessment
	13 - Working Safely with Ladders	X	E - PPE Other Than Respiratory Protection
	14 - Landfill Leachate and Condensate Safe Procedures	X	F - Respiratory Protection
	15 - Lockout and Tagout	X	G - Motor Vehicle and Fleet Safety
	17 - Materials Use and Handling		H - Hearing Conservation
	18 - Polyethylene (PE) Pipe Work Safe Procedures	X	I - Bloodborne Pathogens
X	19 - Site Sanitation Procedures		J - Excavation and Construction Earthwork Program
	20 - Safe Work Practices for Scaffolds		K - Confined Space Entry
X	21 - Safe Procedures for Biological Hazards (Snakes, Insects, Vegetation, Bacteria)		L - Ergonomics Program

JOB TASK SAFETY ANALYSIS (JTSA) AND PPE ASSESSMENT

JTSAs for activities performed at this site have been completed as indicated below and are included as **Attachment 1**. A completed JTSA is required for all work tasks performed at the site. JTSAs are designed to identify steps which involve potential hazards to employees and should be reviewed and understood (and signed providing evidence of understanding) before performing any task at the site. If additional steps or hazards are present, the JTSA should be revised (and the revision signed by all affected staff) to indicate that all items have been appropriately addressed and are understood before proceeding with the task.

Unless identified in an attached Job Task Safety Analysis (JTSA) form, all project tasks are anticipated to only require **Level D** PPE, as defined by the Occupational Safety and Health Administration (OSHA).

SCS field personnel (including subcontractors) will be informed in the use of safety equipment and will be required to wear protective clothing appropriate for the tasks in which they will be involved.

Extra equipment will be located on-site. This equipment will include the following items:

- Tyvek Coverall Suits
- Gloves (nitrile and HexArmor: SharpsMaster II)
- High Visibility Safety Vests
- Eye Protection
- Ear Protection
- Hard Hats
- First Aid Kit

SCS will provide sufficient water for personal use on-site daily.

OTHER INSPECTION PROCEDURES

Periodic site inspections may be made by the Project Supervisor, Project Manager, and Regional Compliance Auditor or Safety Specialist. There is also the potential for the client or regulatory agencies to visit and inspect the site. SCS personnel are to perform tasks in compliance with all contractual, regulatory, and company requirements at all times.

SITE CONTROL

SCS and its subcontractors will be restricted to the sorting area at the Site. A loader will be used to transfer waste samples from the bale area to the sorting area. **Under no circumstances will SCS employees or subcontractors enter unauthorized locations at the Materials Recovery Facility.**

Our clients are responsible for providing SCS employees with safe site access, which includes sites that are free of threats from transients or other aggressive people or animals. If an SCS employee encounters an aggressive person or animal, they should withdraw from the site and contact the Site Representative and their SCS supervisor. The Site Owner is responsible for removing the threats, and SCS employees should not take any affirmative action of their own.

DECONTAMINATION PROCEDURES

The risks of illness due to ingestion of diseased or decomposing materials from the work site are significant. To minimize these risks, all personnel should remove and store the outer layer of their protective clothing (i.e., coveralls, gloves, hard hat, etc.) on-site. Hands, face, and nails should be thoroughly washed, or scrubbed, with soap and water prior to engaging in any activity likely to transmit materials encountered on-site into the mouth. If waste materials come in contact with the skin, that crew member will be temporarily excused to thoroughly wash the affected area with soap and water.

HANDLING OF HAZARDOUS WASTE MATERIALS

Hazardous materials will be avoided during sample selection. If hazardous materials are encountered during the waste sorting activities, they will be segregated from the normal waste and recycling streams and put in separate containers.

Caution will be taken when handling mercury-containing wastes such as fluorescent light bulbs. Care will be taken to not break the glass bulb, and to avoid samples with excess amounts of fluorescent light bulbs. Gloves and Tyvek suits will provide skin protection from mercury compounds.

Extreme care will be taken when handling and disposing of hazardous materials. If subcontractors encounter any material that may be considered hazardous, they will be instructed to report it to the Site Manager immediately.

HOUSEKEEPING REQUIREMENTS

Hand sanitizer and soap will be made available to assist with decontamination. The designated break area is located in the front of the MRF.

5 SITE HAZARDS

Chemical and Physical Agent Hazards

The following chemical and physical hazards should be considered before performing any task or work at the site. The analysis will depend on a thorough understanding of the site's physical characteristics and the task(s) being performed.

Toxic Compounds: Non-Methane Organic Compounds (NMOCs), as well as inorganic toxic contaminants such as mercury, and sometimes even radioactive contaminants such as tritium, may be present on a site. NMOCs include such toxic compounds as benzene, toluene, chloroform, vinyl chloride, carbon tetrachloride, and trichloroethane, which, although commonly less than 1 percent by weight, are hazardous. These potential hazards should be evaluated on a case-by-case basis. Additional precautions will be established as needed.

Poisons: Pesticides, cleaners, or other toxic materials of various types may be present in the waste stream. Avoid contact with these items. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Flammables: Fuel such as gasoline and diesel may be present in the waste stream. Additionally, paint thinners or other flammable materials may be present in the waste. The primary risk associated with these materials is fire. Keep all ignition sources away from flammable materials. Do not smoke, unless in designated areas. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Oxidizers: Fertilizers, pool chemicals, chlorine, or other oxidizers may be present in the waste stream. These materials may be in use at water treatment plants or in the waste at the site. The primary risk from oxidizers is an increased fire potential. Keep fire and fuel or oil away from oxidizers. Do not smoke, unless in designated areas. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Corrosives: Acidic and caustic materials may be present in the waste stream. These materials may be in use at water treatment plants or in the waste at the site. The primary risk from corrosives is damage to the skin or eyes. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Physical Hazards

The following physical hazards should be considered before performing any task or work at the site. Depending on the task(s) being performed, any or all of these hazards may be present.

Heavy Equipment: Compactors, bull dozers, loaders, track hoes, forklifts and large trucks, and other vehicles are present at the MRF. Loud noise and limited visibility can increase the threat of being run over or crushed by these vehicles. Wear high-visibility vests (recommend Class III) and coordinate with vehicle operators when working in the vicinity of these pieces of equipment. Heavy equipment hazards are especially present at or near the tipping floor. When working in this area, equipment operators must be notified. The use of a second person (as a spotter) should be done when working in this area

Heat-Related Injuries: Elevated body temperatures can cause serious injury or death. Working outdoors or in the sun increases the chance of heat-related injuries. This hazard is especially critical when PPE (such as coveralls or rain gear) is worn, since heat from the body becomes trapped inside clothing. Personnel should drink plenty of liquids and take breaks as needed. The following describes the various effects of heat-related injuries.

Heat Disorders and Health Effects:

- **Heat Stroke:** This disorder occurs when the body's system of temperature regulation (e.g., sweating and evaporation) fails and body temperature rises to critical levels. The condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a serious hazard, however. Primary signs and symptoms are confusion, irrational behavior, loss of consciousness, convulsions, a lack of sweating (usually), hot, dry skin, and an abnormally high body temperature. If a worker shows signs of possible heat stroke, call 911 to obtain **immediate** medical assistance. The worker should be placed in a shady area, and his or her outer clothing should be removed. The worker's skin should also be wetted and air movement around the body increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible--by mouth only if the worker is conscious. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment. Regardless of the worker's protests, **no** employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

- **Heat Exhaustion:** The signs and symptoms of heat exhaustion include clammy skin, headache, nausea, vertigo, weakness, thirst, and giddiness. Fortunately, heat exhaustion responds readily to prompt treatment. This condition, however, should not be dismissed lightly, for several reasons. One is that fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended. The victim could also be injured when he or she faints. While the signs and symptoms associated with heat exhaustion are similar to those of heat stroke, the notable difference (with heat

exhaustion) is clammy skin. Workers suffering from heat exhaustion should be removed from hot environments and given fluid replacement, by mouth only if the workers are conscious. They should also be encouraged to get adequate rest.

- **Heat Rashes:** The most common problem occurring in hot work environments is heat rash. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, the papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and papules may become infected if they are not treated. In most cases, heat rash will disappear when the affected individual returns to a cool environment.

- **Heat Fatigue:** One factor that predisposes individuals to heat fatigue is the lack of acclimatization. Use of a program of acclimatization and training for work in hot environments are advisable. The signs and symptoms of heat fatigue include impaired performance of skilled sensorimotor, high-concentration, or high-vigilance activities. The sole treatment available for heat fatigue is to remove heat stress and increase fluid replacement before a more serious heat-related condition develops.

Biological Hazards

Rodents, poisonous insects, snakes, other animals and/or plants are a natural part of any ecosystem. They are sometimes difficult to eliminate or avoid on some sites because of the location. Employees should be aware of the potential for encountering these types of animals and plants. Where possible, nesting places should be removed or access to them should be limited. If several infestations occur, remedies should be discussed with a supervisor and the client (see **SCS IIPP, SOP-21**, for precautions and treatment for biological hazards). The following could be encountered in performance of the operation, maintenance, and monitoring functions of a project:

Hantavirus: Infection typically occurs by the inhalation of tiny airborne droplets of fresh or dried rodent excretions. Transmission to humans may also occur through direct contact with rodents or rodent-contaminated materials, and ingestion of contaminated food or water is also a possible route of transmission. Sweeping or "shaking out" rodent-contaminated materials should be avoided unless performed using respiratory protection. The early symptoms of hantavirus disease are flu-like (fever, chills, muscle aches). For a very short period of time, the infected person starts to feel better. Then, within 1 to 2 days, he or she may develop shortness of breath. The disease gets worse quickly and leads to respiratory failure, a condition known as Hantavirus Pulmonary Syndrome (HPS). About half of all HPS patients experience these symptoms, which usually occur 1 to 5 weeks from contracting the illness.

Bloodborn Pathogens: Human blood can contain harmful viruses such as the Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV). Contact with affected blood, as well as materials contaminated by this blood, can result in transmitting viruses and the life-threatening conditions they cause.

SCS has adopted a Bloodborne Pathogen Exposure Control Plan to protect employees who may come into contact with blood, or materials contaminated with blood, during the performance of

tasks. Although the program is intended to comply with OSHA's Bloodborne Pathogens Standard, 29 CFR 1910.1030, the primary purpose for adopting the plan is to help employees avoid bloodborne pathogens at work.

When an employee is involved in an exposure incident, it must be reported in accordance with the Health and Safety Injury and Illness Prevention Plan. All employees involved in an exposure incident will be offered post-exposure evaluation and follow-up, in accordance with the OSHA standard. Follow-up will include:

- Documentation of the route of exposure and the circumstances related to the incident.
- If possible, identification of the source individual and, if possible, the status of the source individual. The blood of the source individual will be tested (after consent is obtained) for HIV/HBV infectivity.
- Results of testing of the source individual will be made available to the exposed employee, along with applicable laws and regulations concerning disclosure of the identity and infectivity of the source individual.
- The employee will be offered the option of having blood collected for testing of that employee's HIV/HBV serological status. The blood sample will be preserved for at least 90 days to allow the employee to decide if the blood should be tested for HIV serological status. However, if the employee decides, prior to that time, that testing will be conducted, the appropriate action can be taken and the blood sample discarded.
- The employee will be offered post-exposure counseling in accordance with current recommendations of the U.S. Public Health Service.
- The employee will be given appropriate counseling concerning precautions to take during the period after the exposure incident. The employee will also be given information regarding potential illnesses and procedures for reporting related symptoms to appropriate personnel.

Attachment 1 – Job Task Safety Analysis and PPE Assessment Form

JOB TASK SAFETY ANALYSIS AND PPE ASSESSMENT FORM-
JTSA-ES- 16- WASTE SORT

Job Task Safety Analysis Form-01				
Task Type (Check all that Apply)	Solid Waste	**Task Description (include an estimate of task duration in hrs/day)** Five day waste sort, approximately 8 hours per day.		**Location or Project:** Reuter Recycling Facility of Florida, Pembroke Pines **Date Revised:** August 26, 2020 **Project #/Revision #:** 09222033.00
Analysis Team Member	**Position Title**		**Reviewed by**	**Position Title**
Stacey Demers	Project Director			
Brent Dieleman	Project Manager			
Alexis Vento	Staff Professional			
Katherine Hinojosa	Project Professional			
Special Training Required		Bloodborne pathogens training		
Applicable SAFE Checklist(s): Specify type and category number		Environmental Services/Solid Waste Checklist		

This form is the certification that the hazard assessment has been performed for the workplace as required by 29 CFR 1910.132.

CAM #26-0492
Exhibit 2
Page 641 of 1334

Job Task Step	Potential Environmental and Personnel Hazards[1]	Critical Actions	PPE Required
1. Drive to site, set up sorting table and containers.	Heavy lifting Slips/trips/falls Vehicle traffic	• Check in w/facility • Ensure work area is secured/isolated • Use buddy system • Employ safe lifting behaviors • Stretch/warm-up	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Leather outer glove Respiratory: None Hearing: None Eye/Face: Safety glasses
2. Collect solid waste samples from the tipping floor area	Heavy lifting Vehicle/HE traffic Slips/trips/falls Medical/bio waste Sharps Chemical exposures	• Use buddy system • Stay visible • Use safe lifting • Set up away from traffic • Give directions to bobcat operator • Avoid Heavy EQ traffic	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Puncture Resistant Gloves Respiratory: Dust mask Hearing: Earplugs Eye/Face: Safety glasses
3. Hand-sort solid waste materials on the sorting table. (At the MRF)	Heavy lifting Vehicle/HE traffic Slips/trips/falls Medical/bio waste Sharps Chemical exposures Stress/hygiene concerns	• Use buddy system • Stay visible • Use safe lifting • Set up away from traffic • Brush trash (vs digging) • Wash hands freq. • Stay hydrated • Shift breaks	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Puncture Resistant Gloves Respiratory: Dust mask (optional) Hearing: Earplugs (optional) Eye/Face: Safety glasses

CAM #26-0492
Exhibit 2
Page 642 of 1334

Job Task Step	Potential Environmental and Personnel Hazards[1]	Critical Actions	PPE Required
4. Cleanup and Decontaminate	Heavy lifting Slips/trips/falls Vehicle traffic	• Ensure work area is secured/isolated • Use buddy system • Employ safe lifting behaviors • Stretch/warm-up • Decontaminate PPE	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Leather outer glove Respiratory: Dust mask (optional) Hearing: None Eye/Face: Safety glasses
5. Demo	Vehicle/HE traffic	• Check out w/facility	Head: None Body: High Visibility Vest Foot: Steel--toe ANSI boots Hand: None Respiratory: None Hearing: None Eye/Face: None
End of JTSA Form			

CAM #26-0492
Exhibit 2
Page 643 of 1334

Appendix A (continued)
Health & Safety Plans

Broward County Landfill
Owned and Operated by Broward County Government

Site-Specific Health and Safety Plan
Broward County Landfill

Broward County
Waste Characterization Study
September 15, 2022

REQUIRED APPROVAL			
SCS OSHC or designee:	John Jones	Date:	September 15, 2022
SCS PM:	Stacey Demers	Date:	September 15, 2022

Project No.:	09222033.00 Tasks 701, 702, 703, 704
Project Name:	Broward Co Waste Characterization Study
Site Address:	7101 SW 205th Ave, Southwest Ranches, FL 33029
Client Contact:	Dale Henderson

EMERGENCY TELEPHONE NUMBERS	
Fire:	911 or (954) 434-0008 (non emergency)
Police:	911 or (954) 764-4357 (non-emergency)
Hospital	(954) 276-1285 Memorial Urgent Care
Ambulance:	911
WorkCare Service for SCS Employees	1-800-455-6155
The directions and information on the nearest hospital are found on Page **3**.	

ACKNOWLEDGEMENT PAGE

"I have read the attached Health and Safety Plan for the Waste Characterization Study. I have discussed any questions and/or concerns that I have regarding the contents of this document with the designated SCS project safety representative, and I understand its requirements.

Name	Signature	Company	Date

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Attachments

Attachment 1 – Job Task Safety Analysis and PPE Assessment Form

1 INTRODUCTION

At SCS, protection of human health and the environment is paramount. This Site-Specific Health and Safety Plan (SSHSP) provides information to identify hazards that may be present and/or introduced by project's activities onto SCS job sites, and details needed precautions that employees should follow to protect themselves. Tasks performed on site or during projects should be analyzed to determine if physical or chemical hazards requiring safeguards or additional Personal Protective Equipment (PPE) exist. This plan will be modified as necessary if any new hazards are identified during the project that require that additional safeguards be put in place. This plan is in the draft stage, approval will be gained from the SCS Office Safety and Health Coordinator prior to any field activities.

PROJECT ORGANIZATION

On-site Health and Safety Representative:	Brent Dieleman Alexis Vento Katherine Hinojosa	202-841-9827
Project Manager:	Stacey Demers	703-929-2986
Client Representative:	Notosha Austin	954-474-1880

SCOPE OF WORK – WASTE CHARACTERIZATION

Material characterization involves collecting field samples and sorting the municipal solid waste into designated categories.

Accidents may occur due to the potential hazards associated with the presence of heavy equipment at the site, the components of the waste itself (potentially sharp objects, broken glass), climatic conditions, trips and falls from stairs in the MRF, and carelessness. At transfer stations and landfills, combustion of the waste materials on the tipping floor or in "Hot Loads" from refuse vehicles can present potential hazards.

The presence of heavy equipment in operation at the site (end loaders, graders, transfer station compactors, garbage trucks, etc.) presents potential hazards which can be avoided with the use of general common sense and staying visible. The equipment operators generally are involved in performing their tasks and may be unaware of the presence of other individuals within the immediate area. Personnel will be trained to be aware of the movement and location of equipment at all times. Also, highly visible clothing, including safety vests and hard hats, is required.

The components of municipal solid waste (and MRF residuals) present potential physical hazards. These include, but are not limited to, cuts from broken glass and sharp metal objects; splinters from pieces of wood; punctures from nails and other sharp objects; and scrapes and abrasions from the general handling of the solid waste. There also exists the potential for exposure to household products, such as bleach, cleansers, and other toxic chemicals.

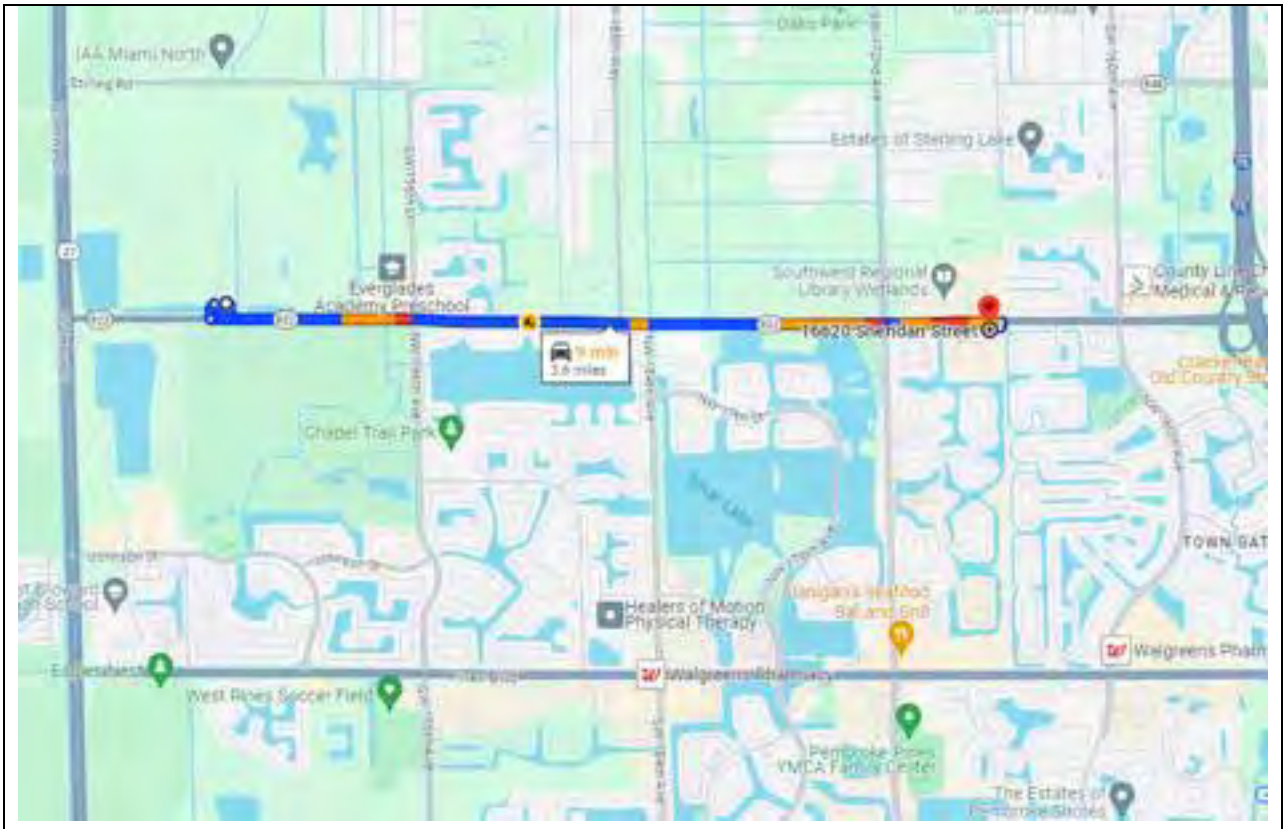
To alleviate the possibility of injury, caution should be employed at all times when physically handling the solid waste. Protective clothing, including gloves and safety glasses, should be worn at all times. If there is any question about the handling of a component of solid waste, the Crew Chief should be notified.

Caution should be taken to avoid the possibility of heat stress due to protective clothing or weather.

Materials deposited at the site can pose a potential fire hazard. Fires can be started through carelessness, sparks, or from "Hot Loads" handled at the refuse facilities. If fire or smoke is observed, site personnel should be notified immediately, all SCS personnel and subcontractors should leave the immediate area at once, and the local emergency fire department should be notified.

2 EMERGENCY RESPONSE AND MEDICAL TREATMENT PROCEDURES

EMERGENCY CONTACT AND NOTIFICATION INFORMATION



1. Make a Left onto Sheridan St (FL 822)
2. Continue on Sheridan St (FL 822) for 3.4 miles
3. Turn right at 16620 Sheridan St (FL 822)

Figure 1. Map to the Hospital and Directions

Memorial Urgent Care Center Pembroke Pines
16620 Sheridan Street, Pembroke Pines, FL 33331
954-276-1285

ACCIDENT OR INCIDENT REPORTING SYSTEM

In the event of an emergency at the site, project personnel should call 911 for emergency assistance. After the immediate emergency situation has been addressed by emergency personnel, SCS project personnel should call the SCS Project Manager and the Client Representative and inform them of the situation. The Project Manager should evaluate the nature of the emergency and direct project personnel actions from that point.

NOTIFICATION PROCEDURES FOR INCIDENTS (CLIENT, LOCAL, STATE, OR FEDERAL)

Site personnel should contact their supervisor immediately when an accident or injury occurs, and provide any needed information so that additional notifications can be determined and completed as needed.

METHODS TO SUMMON EMERGENCY RESPONSE TEAM

Emergency services can be summoned through 911, as this service is active in the area.

RESCUE AND MEDICAL TREATMENT REQUIREMENTS

Stop work authority should be exercised when an injury or accident occurs. The appropriate emergency agency should be contacted and first aid administered, if possible. If the injury is not life-threatening and does not require emergency response, contact WorkCare (SCS health advice service) at (800) 455-6155. First aid kits and fire extinguishers are available in each SCS work truck.

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LOCATION DESCRIPTION

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JOB TASK SAFETY ANALYSIS (JTSA) AND PPE ASSESSMENT

JTSAs for activities performed at this site have been completed as indicated below and are included as **Attachment 1**. A completed JTSA is required for all work tasks performed at the site. JTSAs are designed to identify steps which involve potential hazards to employees and should be reviewed and understood (and signed providing evidence of understanding) before performing any task at the site. If additional steps or hazards are present, the JTSA should be revised (and the revision signed by all affected staff) to indicate that all items have been appropriately addressed and are understood before proceeding with the task.

Unless identified in an attached Job Task Safety Analysis (JTSA) form, all project tasks are anticipated to only require **Level D** PPE, as defined by the Occupational Safety and Health Administration (OSHA).

SCS field personnel (including subcontractors) will be informed in the use of safety equipment and will be required to wear protective clothing appropriate for the tasks in which they will be involved.

Extra equipment will be located on-site. This equipment will include the following items:

- Tyvek Coverall Suits
- Gloves (nitrile and HexArmor: SharpsMaster II)
- High Visibility Safety Vests
- Eye Protection
- Ear Protection
- Hard Hats
- First Aid Kit

SCS will provide sufficient water for personal use on-site daily.

OTHER INSPECTION PROCEDURES

Periodic site inspections may be made by the Project Supervisor, Project Manager, and Regional Compliance Auditor or Safety Specialist. There is also the potential for the client or regulatory agencies to visit and inspect the site. SCS personnel are to perform tasks in compliance with all contractual, regulatory, and company requirements at all times.

SITE CONTROL

SCS and its subcontractors will be restricted to the sorting area at the Site. A loader will be used to transfer waste samples from the bale area to the sorting area. **Under no circumstances will SCS employees or subcontractors enter unauthorized locations at the Materials Recovery Facility.**

Our clients are responsible for providing SCS employees with safe site access, which includes sites that are free of threats from transients or other aggressive people or animals. If an SCS employee encounters an aggressive person or animal, they should withdraw from the site and contact the Site Representative and their SCS supervisor. The Site Owner is responsible for removing the threats, and SCS employees should not take any affirmative action of their own.

DECONTAMINATION PROCEDURES

The risks of illness due to ingestion of diseased or decomposing materials from the work site are significant. To minimize these risks, all personnel should remove and store the outer layer of their protective clothing (i.e., coveralls, gloves, hard hat, etc.) on-site. Hands, face, and nails should be thoroughly washed, or scrubbed, with soap and water prior to engaging in any activity likely to transmit materials encountered on-site into the mouth. If waste materials come in contact with the skin, that crew member will be temporarily excused to thoroughly wash the affected area with soap and water.

HANDLING OF HAZARDOUS WASTE MATERIALS

Hazardous materials will be avoided during sample selection. If hazardous materials are encountered during the waste sorting activities, they will be segregated from the normal waste and recycling streams and put in separate containers.

Caution will be taken when handling mercury-containing wastes such as fluorescent light bulbs. Care will be taken to not break the glass bulb, and to avoid samples with excess amounts of fluorescent light bulbs. Gloves and Tyvek suits will provide skin protection from mercury compounds.

Extreme care will be taken when handling and disposing of hazardous materials. If subcontractors encounter any material that may be considered hazardous, they will be instructed to report it to the Site Manager immediately.

HOUSEKEEPING REQUIREMENTS

Hand sanitizer and soap will be made available to assist with decontamination. The designated break area is located in the front of the MRF.

5 SITE HAZARDS

Chemical and Physical Agent Hazards

The following chemical and physical hazards should be considered before performing any task or work at the site. The analysis will depend on a thorough understanding of the site's physical characteristics and the task(s) being performed.

Toxic Compounds: Non-Methane Organic Compounds (NMOCs), as well as inorganic toxic contaminants such as mercury, and sometimes even radioactive contaminants such as tritium, may be present on a site. NMOCs include such toxic compounds as benzene, toluene, chloroform, vinyl chloride, carbon tetrachloride, and trichloroethane, which, although commonly less than 1 percent by weight, are hazardous. These potential hazards should be evaluated on a case-by-case basis. Additional precautions will be established as needed.

Poisons: Pesticides, cleaners, or other toxic materials of various types may be present in the waste stream. Avoid contact with these items. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Flammables: Fuel such as gasoline and diesel may be present in the waste stream. Additionally, paint thinners or other flammable materials may be present in the waste. The primary risk associated with these materials is fire. Keep all ignition sources away from flammable materials. Do not smoke, unless in designated areas. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Oxidizers: Fertilizers, pool chemicals, chlorine, or other oxidizers may be present in the waste stream. These materials may be in use at water treatment plants or in the waste at the site. The primary risk from oxidizers is an increased fire potential. Keep fire and fuel or oil away from oxidizers. Do not smoke, unless in designated areas. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Corrosives: Acidic and caustic materials may be present in the waste stream. These materials may be in use at water treatment plants or in the waste at the site. The primary risk from corrosives is damage to the skin or eyes. Pay close attention to where you walk and what you touch such that materials do not accidentally come into contact with skin, eyes, mouth, or clothing. Immediately remove any contaminated clothing, and wash with soapy water any skin that becomes contaminated. Avoid contact at all times.

Physical Hazards

The following physical hazards should be considered before performing any task or work at the site. Depending on the task(s) being performed, any or all of these hazards may be present.

Heavy Equipment: Compactors, bull dozers, loaders, track hoes, forklifts and large trucks, and other vehicles are present at the MRF. Loud noise and limited visibility can increase the threat of being run over or crushed by these vehicles. Wear high-visibility vests (recommend Class III) and coordinate with vehicle operators when working in the vicinity of these pieces of equipment. Heavy equipment hazards are especially present at or near the tipping floor. When working in this area, equipment operators must be notified. The use of a second person (as a spotter) should be done when working in this area

Heat-Related Injuries: Elevated body temperatures can cause serious injury or death. Working outdoors or in the sun increases the chance of heat-related injuries. This hazard is especially critical when PPE (such as coveralls or rain gear) is worn, since heat from the body becomes trapped inside clothing. Personnel should drink plenty of liquids and take breaks as needed. The following describes the various effects of heat-related injuries.

Heat Disorders and Health Effects:

- **Heat Stroke:** This disorder occurs when the body's system of temperature regulation (e.g., sweating and evaporation) fails and body temperature rises to critical levels. The condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a serious hazard, however. Primary signs and symptoms are confusion, irrational behavior, loss of consciousness, convulsions, a lack of sweating (usually), hot, dry skin, and an abnormally high body temperature. If a worker shows signs of possible heat stroke, call 911 to obtain **immediate** medical assistance. The worker should be placed in a shady area, and his or her outer clothing should be removed. The worker's skin should also be wetted and air movement around the body increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible--by mouth only if the worker is conscious. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment. Regardless of the worker's protests, **no** employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

- **Heat Exhaustion:** The signs and symptoms of heat exhaustion include clammy skin, headache, nausea, vertigo, weakness, thirst, and giddiness. Fortunately, heat exhaustion responds readily to prompt treatment. This condition, however, should not be dismissed lightly, for several reasons. One is that fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended. The victim could also be injured when he or she faints. While the signs and symptoms associated with heat exhaustion are similar to those of heat stroke, the notable difference (with heat

exhaustion) is clammy skin. Workers suffering from heat exhaustion should be removed from hot environments and given fluid replacement, by mouth only if the workers are conscious. They should also be encouraged to get adequate rest.

- **Heat Rashes:** The most common problem occurring in hot work environments is heat rash. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, the papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and papules may become infected if they are not treated. In most cases, heat rash will disappear when the affected individual returns to a cool environment.

- **Heat Fatigue:** One factor that predisposes individuals to heat fatigue is the lack of acclimatization. Use of a program of acclimatization and training for work in hot environments are advisable. The signs and symptoms of heat fatigue include impaired performance of skilled sensorimotor, high-concentration, or high-vigilance activities. The sole treatment available for heat fatigue is to remove heat stress and increase fluid replacement before a more serious heat-related condition develops.

Biological Hazards

Rodents, poisonous insects, snakes, other animals and/or plants are a natural part of any ecosystem. They are sometimes difficult to eliminate or avoid on some sites because of the location. Employees should be aware of the potential for encountering these types of animals and plants. Where possible, nesting places should be removed or access to them should be limited. If several infestations occur, remedies should be discussed with a supervisor and the client (see **SCS IIPP, SOP-21**, for precautions and treatment for biological hazards). The following could be encountered in performance of the operation, maintenance, and monitoring functions of a project:

Hantavirus: Infection typically occurs by the inhalation of tiny airborne droplets of fresh or dried rodent excretions. Transmission to humans may also occur through direct contact with rodents or rodent-contaminated materials, and ingestion of contaminated food or water is also a possible route of transmission. Sweeping or "shaking out" rodent-contaminated materials should be avoided unless performed using respiratory protection. The early symptoms of hantavirus disease are flu-like (fever, chills, muscle aches). For a very short period of time, the infected person starts to feel better. Then, within 1 to 2 days, he or she may develop shortness of breath. The disease gets worse quickly and leads to respiratory failure, a condition known as Hantavirus Pulmonary Syndrome (HPS). About half of all HPS patients experience these symptoms, which usually occur 1 to 5 weeks from contracting the illness.

Bloodborn Pathogens: Human blood can contain harmful viruses such as the Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV). Contact with affected blood, as well as materials contaminated by this blood, can result in transmitting viruses and the life-threatening conditions they cause.

SCS has adopted a Bloodborne Pathogen Exposure Control Plan to protect employees who may come into contact with blood, or materials contaminated with blood, during the performance of

tasks. Although the program is intended to comply with OSHA's Bloodborne Pathogens Standard, 29 CFR 1910.1030, the primary purpose for adopting the plan is to help employees avoid bloodborne pathogens at work.

When an employee is involved in an exposure incident, it must be reported in accordance with the Health and Safety Injury and Illness Prevention Plan. All employees involved in an exposure incident will be offered post-exposure evaluation and follow-up, in accordance with the OSHA standard. Follow-up will include:

- Documentation of the route of exposure and the circumstances related to the incident.
- If possible, identification of the source individual and, if possible, the status of the source individual. The blood of the source individual will be tested (after consent is obtained) for HIV/HBV infectivity.
- Results of testing of the source individual will be made available to the exposed employee, along with applicable laws and regulations concerning disclosure of the identity and infectivity of the source individual.
- The employee will be offered the option of having blood collected for testing of that employee's HIV/HBV serological status. The blood sample will be preserved for at least 90 days to allow the employee to decide if the blood should be tested for HIV serological status. However, if the employee decides, prior to that time, that testing will be conducted, the appropriate action can be taken and the blood sample discarded.
- The employee will be offered post-exposure counseling in accordance with current recommendations of the U.S. Public Health Service.
- The employee will be given appropriate counseling concerning precautions to take during the period after the exposure incident. The employee will also be given information regarding potential illnesses and procedures for reporting related symptoms to appropriate personnel.

Attachment 1 – Job Task Safety Analysis and PPE Assessment Form

JOB TASK SAFETY ANALYSIS AND PPE ASSESSMENT FORM-
JTSA-ES- 16- WASTE SORT

Job Task Safety Analysis Form-01				
Task Type (Check all that Apply)	Solid Waste	**Task Description (include an estimate of task duration in hrs/day)** Five day waste sort, approximately 8 hours per day.		**Location or Project:** Reuter Recycling Facility of Florida, Pembroke Pines **Date Revised:** August 26, 2020 **Project #/Revision #:** 09222033.00
Analysis Team Member	**Position Title**		**Reviewed by**	**Position Title**
Stacey Demers	Project Director			
Brent Dieleman	Project Manager			
Alexis Vento	Staff Professional			
Katherine Hinojosa	Project Professional			
Special Training Required		Bloodborne pathogens training		
Applicable SAFE Checklist(s): Specify type and category number		Environmental Services/Solid Waste Checklist		

This form is the certification that the hazard assessment has been performed for the workplace as required by 29 CFR 1910.132.

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Job Task Step	Potential Environmental and Personnel Hazards[1]	Critical Actions	PPE Required
1. Drive to site, set up sorting table and containers.	Heavy lifting Slips/trips/falls Vehicle traffic	• Check in w/facility • Ensure work area is secured/isolated • Use buddy system • Employ safe lifting behaviors • Stretch/warm-up	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Leather outer glove Respiratory: None Hearing: None Eye/Face: Safety glasses
2. Collect solid waste samples from the tipping floor area	Heavy lifting Vehicle/HE traffic Slips/trips/falls Medical/bio waste Sharps Chemical exposures	• Use buddy system • Stay visible • Use safe lifting • Set up away from traffic • Give directions to bobcat operator • Avoid Heavy EQ traffic	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Puncture Resistant Gloves Respiratory: Dust mask Hearing: Earplugs Eye/Face: Safety glasses
3. Hand-sort solid waste materials on the sorting table. (At the MRF)	Heavy lifting Vehicle/HE traffic Slips/trips/falls Medical/bio waste Sharps Chemical exposures Stress/hygiene concerns	• Use buddy system • Stay visible • Use safe lifting • Set up away from traffic • Brush trash (vs digging) • Wash hands freq. • Stay hydrated • Shift breaks	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Puncture Resistant Gloves Respiratory: Dust mask (optional) Hearing: Earplugs (optional) Eye/Face: Safety glasses

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Job Task Step	Potential Environmental and Personnel Hazards[1]	Critical Actions	PPE Required
4. Cleanup and Decontaminate	Heavy lifting Slips/trips/falls Vehicle traffic	• Ensure work area is secured/isolated • Use buddy system • Employ safe lifting behaviors • Stretch/warm-up • Decontaminate PPE	Head: Hardhat Body: Safety vest, Tyvek Foot: Steel--toe ANSI boots Hand: Nitrile + Leather outer glove Respiratory: Dust mask (optional) Hearing: None Eye/Face: Safety glasses
5. Demo	Vehicle/HE traffic	• Check out w/facility	Head: None Body: High Visibility Vest Foot: Steel--toe ANSI boots Hand: None Respiratory: None Hearing: None Eye/Face: None
End of JTSA Form			

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Appendix B
Field Procedures

Waste Composition Study Field Procedures and Report Summary

Broward County, Florida
Solid Waste and Recycling Services
1 N. University Drive, Suite 400
Plantation, FL 33324

SCS ENGINEERS

09222033.00 | November 29, 2022

10752 Deerwood Park Blvd. Ste. 100
Jacksonville, FL 32256
904-431-6900

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1 INTRODUCTION

PURPOSE

The purpose of this document is to provide Broward County with a reference guide detailing the characterization and sorting procedures to be used during the four-season waste composition study that also includes a two-season recycling composition study. This document will serve as a technical reference during the field activities and support the project's subsequent data analysis.

STAFFING AND RESPONSIBILITIES

Two SCS professionals will be onsite in the field and will be responsible for adherence to the established procedures and protocols described in this document. This includes the SCS Field Supervisor and Assistant Field Supervisor. Each of these individuals will understand the County's goals and objectives for this study as well as the project's scope and requirements. SCS field staff have the authority to make project level decisions regarding procedural changes and execution as needed during changing field conditions and both individuals are empowered to stop work if unsafe conditions exist. The SCS Field Supervisor has the following primary responsibilities:

- Training SCS staff and subcontractors in field activities.
- Requiring health and safety procedures be followed and required personal protective equipment (PPE) is available and worn by field staff in accordance with the Site-Specific Health and Safety Plan.
- Confirming established waste screening and sorting procedures are available and properly implemented by SCS and subcontractor personnel.
- Identifying and correcting procedures or processes that may compromise the integrity of the data.
- Communicating daily with the SCS Project Manager.

The Assistant SCS Field Supervisor will support the SCS Field Supervisor in enforcing and executing the responsibilities described above.

2 FIELD PROCEDURES

This section describes the field procedures for characterizing municipal solid waste (MSW), source-separated recyclables, construction and demolition (C&D) materials and bulky waste.

MUNICIPAL SOLID WASTE (MSW)

MSW includes waste materials destined for landfill or waste-to-energy (WTE) disposal. SCS follows American Society of Testing and Measurement (ASTM) Method Number D5231-92(2016), "Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste" for acquiring representative waste samples and manually sorting the waste samples into material types.

Most MSW generated in Broward County is disposed through the Wheelabrator South Broward Waste-to-Energy facility (owned and operated by WIN Waste Innovations) and the North Broward Transfer Station (owned by Waste Management, Inc. and operated by WIN Waste Innovations). Representatives at WIN Waste Innovations allowed the County to conduct the waste sampling and sorting at the North Broward Transfer Station.

Waste Load Screening

Vehicles entering the solid waste disposal facility will be screened to assess whether the materials on the truck should be sampled as part of the study. SCS staff will work with facility operators to establish a procedure where SCS staff can record information about the targeted waste loads such as hauler name, origin/location of the materials, and generating sector(s) of the materials. If the vehicle driver indicates the material is mixed from multiple generators (i.e. residential and commercial waste mixed together) or SCS staff otherwise believe the materials are not representative, the wasteload will not be sampled. Information obtained from the driver will be compared to the sampling plan to confirm whether the load is part of the project's sampling plan. SCS may request scalehouse data for each day of field activities to have an idea of how much and what locations and generating sectors of materials may be arriving at the facility each day.

Based on the driver interview, if SCS staff determine the materials could be included as part of the study, the driver will be directed to a pre-arranged area of the facility for load discharge. Once the driver has dumped the waste in the designated area, SCS staff will visually inspect the waste pile by walking around it and note unusual characteristics. At SCS staff's discretion, the waste sample may be discarded and another one obtained if the material is not deemed representative for sampling. However, if the material appears to be acceptable and representative, SCS staff will record details of the sample and where it originated on the waste sample data form and may take a photo of the material.

Waste loads will be targeted throughout each sample day so that a variety of sectors (residential and commercial) and originating communities are sampled. Due to limited space available to stage waste samples for hand-sorting, waste loads will be targeted for sampling as space becomes available to store the sample until the sorting crew is ready to hand-sort the sample.

Sample Acquisition

Once a waste load has been selected for sampling, SCS staff will visually separate the pile into six subsections and use a random number generator to select which section of the pile the sample is obtained. SCS staff will direct a heavy equipment operator (to be provided by the host facility) to

scoop up a waste sample from the designed section. In general, a loader with a one cubic yard bucket/scoop is sufficient. SCS staff will place each sample in containers and weigh the materials until approximately 220 pounds has been obtained. This protocol aligns with the ASTM standard for the characterization of unprocessed municipal solid waste.

Sample Sorting

Sorting of waste samples will be led by an experienced Sorting Manager with the support of a six person sort crew. Fundamental to this task is a consistent, methodical, statistically-valid sorting program that will be repeated for each waste sample. The Sorting Manager will oversee the entire sorting process and will be actively conducting quality control measures to make sure materials are sorted and weighed properly. Each member of the sort crew will be assigned a select material group(s) for sorting (i.e. paper categories, plastic categories, etc.). This improves the efficiency and accuracy of the sorting process because sort staff specialize and become experts in sorting the materials they are assigned. The basic procedures and objectives for sorting will be identical for each sample as described in the systematic approach below.

Step #	MSW Sorting Activity
1	Material sample is transferred from containers to sort table; large or heavy items, such as cardboard, wood panels, or bulky waste are examined and placed directly into the appropriate container for subsequent weighing.
2	Plastic bags containing materials are opened and the contents are manually separated according to the material category list and placed in the appropriate container; this process continues until the sample has been characterized down to a particle size of 2-inches or less; the SCS Sorting Manager will oversee operations and provide continual quality control of the sorted material categories.
3	Containers with the sorted materials will be individually weighed by the SCS Sorting Manager who will also perform additional quality control measures to confirm the purity of each sorted material category; tare weights of the empty containers and containers with the materials will be recorded on each sample data sheet, which is unique for every sample; measurements will be made to the nearest tenth of a pound.
4	Small waste items (2-inches or less) will be swept off the sort table in a separate container for weighing. These small items are considered “fines.”
5	Upon completion of weighing all sorted materials, materials will be deposited in specified containers (or location) for recycling or disposal. Each host facility will be responsible for disposal or recycling of materials.

Waste samples are maintained in as-disposed conditions. Proper site layout and close supervision of sampling avoids the need to handle waste samples multiple times. Prior to fieldwork, the tare weight

of each container used to hold sorted materials is recorded directly on the container and noted when recording the entire weight of the container and contents.

MSW Material Categories

Table 1 presents the material categories into which the MSW samples will be sorted.

Table 1. MSW Material Categories

Material Category		Examples
Paper	Compostable Paper	Food-contaminated paper towels, napkins
	Newspaper	Daily/weekly newspapers, coated newspaper inserts, newsprint
	Corrugated Cardboard	Packing or shipping boxes
	Office Paper	White or colored printing/copier paper, file folders
	Magazines	Glossy or higher grade paper magazines/catalogs
	Mixed Paper	Envelopes, junk mail, construction paper, wrapping paper
	Aseptic Cartons	Plastic- or wax-coated containers, milk & juice cartons, take-out boxes
Plastics	#1 PET Bottles	Rigid clear or colored bottles for soda, mouthwash, juice, water, etc.
	#2 HDPE Natural Containers	Translucent containers for shampoos, detergents, automobile fluids, milk, juice, syrup, etc.
	#2 HDPE Color Containers	Opaque white or colored bottles for milk, juice, syrups, cleaning products, etc.
	Other Mixed Plastic Containers	Rigid containers/bottles numbered #3, #4, #5, or #7
	Polystyrene	Food packaging (clamshells), cups, packing peanuts, CD cases with #6
	Rigid Plastics	Hard plastic toys, outdoor chairs, large containers
	Shrink Wrap	Film plastic typically used to wrap pallets or bulk items
	Grocery Store Bags	Grocery store bags
	Plastic Films	Thin plastic wrap or food packaging (NO trash bags)
Glass	Glass Containers	Colored or clear glass containers or bottles
Me	Non-Ferrous Metals	Aluminum pans, scraps; brass, copper, or other alloys not containing iron

Material Category		Examples
	Ferrous Metals	Steel and bi-metal scraps such as wire coat hangers, nails, screws, auto parts, and other magnetic items
	Steel Cans	Ferrous food, beverage, and non-hazardous aerosol cans
	Aluminum Cans	Soda and beer cans
Organics	Food Waste	Food scraps, rotten food, meat, fruit, vegetables, etc.
	Other Organic (Wood)	Furniture such as couches, wooden tables or chairs, cabinets, shelves
	Other Uncategorized	Commingled waste/scraps, otherwise not categorized
	Yard Trash	Grass, leaves, brush, sticks and twigs
	Textiles	Clothing, linens, leather, synthetic fibers, blankets, rubber
Bulky/C&D	Concrete	Cinderblocks, concrete chunks/debris
	Brick	Clay or limestone bricks for masonry, walls, pavements
	Rock	Stones, pebbles, slate, gravel
	Gypsum Board/Drywall	Drywall chunks/debris, sheetrock
	Insulation	Mineral wool, fiberglass, natural fiber insulation
	Clean Engineered Wood	Wooden boards, pallets
	Treated Wood	Stained or painted wood
	Rebar	Reinforcing steel bars
	Other Metal	Other metal scraps non-categorized
	Asphalt Roofing	Asphalt shingles
	Asphalt Paving	Broken chunks of asphalt
	Carpet & Carpet Padding	Carpets and rugs, padding & non-slip grips
	Mattresses/Box springs	Mattresses/mattress materials & box springs
	Bulky Waste	Bulky materials that do not fit other categories
	White Goods	Large electrical appliances such as refrigerators, washing machines, microwaves
	PVC Pipe	Thermoplastic resin commonly used for manufacturing sewage pipes, water mains and irrigation
Other	Tires	Automobile, bicycle, wheelbarrow or other tires
	HHW	Compact fluorescent lightbulbs, fluorescent tubes, household cleaners, medical waste
	Special	Household batteries, electronics, latex paint
	Miscellaneous	Not classified above, includes trash bags

SOURCE-SEPARATED RECYCLABLES

Reuter Recycling in Pembroke Pines, owned and operated by Waste Management, Inc., processes most of the recyclable material generated in Broward County. Recyclable materials are direct hauled to the Deerfield Beach Recycling and Transfer facility where they are aggregated and transported via transfer trailer to Reuter Recycling. Recyclable materials from both residential and commercial sources is combined prior to delivery to Reuters Recycling.

Sample Screening

Transfer trailers that deliver materials generated in Broward County and aggregated in Deerfield Beach will be targeted for sampling and sorting activities. If the vehicle driver indicates the material is atypical or SCS staff otherwise believe the materials are not representative, the load will not be sampled.

Once the driver has dumped the load of recyclable materials, SCS staff will visually inspect the waste pile by walking around it and note unusual characteristics. At SCS staff's discretion, the sample may be discarded and another one obtained if the material is not deemed representative for sampling. However, if the material appears to be acceptable and representative, SCS staff will record details of the sample and where it originated on the sample data form and may take a photo of the material.

Sample Acquisition

Once a recycling load has been selected for sampling, SCS staff will visually separate the pile into six subsections and use a random number generator to select which section of the pile the sample is obtained. SCS staff will direct a heavy equipment operator (to be provided by the host facility) to scoop up a waste sample from the designed section. In general, a loader with a one cubic yard bucket/scoop is sufficient. SCS staff will place each sample in containers and weigh the materials until approximately 150 pounds has been obtained.

Sample Sorting

Sorting of recycling samples will be led by an experienced Sorting Manager with the support of a six person sort crew. Fundamental to this task is a consistent, methodical, statistically-valid sorting program that will be repeated for each recycling sample. The Sorting Manager will oversee the entire sorting process and will be actively conducting quality control measures to make sure materials are sorted and weighed properly. Each member of the sort crew will be assigned a select material group(s) for sorting (i.e. paper categories, plastic categories, etc.). This improves the efficiency and accuracy of the sorting process because sort staff specialize and become experts in sorting the materials they are assigned. The basic procedures and objectives for sorting will be identical for each sample as described in the systematic approach below.

Step #	Recycling Sorting Activity
1	Material sample is transferred from holding containers to sort table; large or heavy items, such as cardboard, are examined and placed directly into the appropriate container for subsequent weighing.

Step #	Recycling Sorting Activity
2	Plastic bags containing recyclable materials are opened and the contents are manually separated according to the material category list and placed in the appropriate container; this process continues until the sample has been characterized down to a particle size of 2-inches or less; the SCS Sorting Manager will oversee operations and provide continual quality control of the sorted material categories.
3	Containers with the sorted materials will be individually weighed by the SCS Sorting Manager who will also perform additional quality control measures to confirm the purity of each sorted material category; tare weights of the empty containers and containers with the materials will be recorded on each sample data sheet, which is unique for every sample; measurements will be made to the nearest tenth of a pound.
4	Small waste items (2-inches or less) will be swept off the sort table in a separate container for weighing. These small items are considered "fines."
5	Upon completion of weighing all sorted materials, materials will be deposited in specified containers (or location) for recycling or disposal. Each host facility will be responsible for disposal or recycling of materials.

Recycling samples are maintained in as-disposed conditions. Proper site layout and close supervision of sampling avoids the need to handle waste samples multiple times. Prior to fieldwork, the tare weight of each container used to hold sorted materials is recorded directly on the container and noted when recording the entire weight of the container and contents.

Source-Separated Recyclable Material Categories

Table 2 presents the material categories into which the source-separated recyclable material samples will be sorted.

Table 2. Source-Separated Recyclable Material Categories

Material Category	Examples
Newspaper	Newspapers, coated newspaper inserts, newsprint
Corrugated Cardboard	Packing or shipping boxes
Office Paper	White or colored printing/copier paper, file folders
Magazines	Glossy or higher grade paper magazines/catalogs
Mixed Paper	Envelopes, junk mail, construction paper, wrapping paper
Aseptic Cartons	Plastic- or wax-coated containers, milk & juice cartons
#1 PET Bottles	Rigid clear or colored bottles for soda, mouthwash, juice, water, etc.

Material Category	Examples
#2 HDPE Natural Containers	Translucent containers for shampoos, detergents, milk, juice, syrup, etc.
#2 HDPE Color Containers	Opaque white or colored bottles for milk, juice, syrups, cleaning products, etc.
Other Mixed Plastic Containers	Rigid containers/bottles numbered #3, #4, #5, or #7
Polystyrene	Food packaging (clamshells), cups, packing peanuts, CD cases with #6
Glass Containers	Colored or clear glass containers or bottles
Steel Cans	Ferrous food, beverage, and non-hazardous aerosol cans
Aluminum Cans	Soda and beer cans
Grocery Store Bags	Grocery store bags
Plastic Film	Thin plastic wrap or food packaging (NO trash bags)
Residue	Other non-recyclable contamination

CONSTRUCTION & DEMOLITION (C&D) AND BULKY WASTE

The Broward County Landfill receives a significant amount of C&D and self-haul bulky waste materials from a broad spectrum of municipalities and generating sectors that facilitate a representative characterization process. These materials are not conducive to manual sorting. Obtaining a 220-pound sample of this material (similar to the protocol for waste (MSW) and source-separated recyclable materials) would not be representative due to the size and weight of the material. As a result, C&D and bulky waste loads delivered to the Broward County Landfill will be visually characterized.

Sample Screening

SCS will designate one C&D and bulky waste characterization manager that will select loads to screen and visually characterize. This professional will interview drivers to confirm origins of each sample. Once a selected load is discharged, the SCS professional will walk around the entire pile and make notes on the materials present. Based on volume, the SCS professional will estimate the percent composition of each of the designated material components (from agreed upon material category list for both C&D and bulky waste) in the load and record the data on the sample record. This individual will confirm that the percentages for each sample equal 100 percent. Estimated volumes will be converted to weights using volume-to-weight conversion factors.

Waste Load Characterization

C&D and Bulky Waste loads will be characterized visually using a method that was developed by the California Integrated Waste Management Board. For these samples, the entire load of each sampled vehicle is characterized. Once the selected load is dumped, the visual estimator performs the following steps.

- **Step 1: Measure load volume.** After the driver dumps the load onto the ground, the visual estimator estimates the length, width, and height of the load and records the information on the visual sample form.

- **Step 2: Note which material classes and materials are present.** The visual estimator walks entirely around the load and indicated on the visual sample form which materials and material classes were present in the load.

- **Step 3: Estimate composition by volume for each material class.** Beginning with the largest material class present by volume, the visual estimator then estimates the volumetric percentage of this material class and records it on the form. This process iss repeated for the next most common material class, and so forth, until the volume percentage of every material class had been estimated. The estimator then calculated the total for this step, ensuring that it totaled 100 percent.

- **Step 5: Check and reconcile percentage data.** The visual estimator then verifies the percentage estimates for the material classes added to 100 percent.

C&D and Bulky Waste Material Categories

Table 3 presents the material categories into which the C&D and Bulky Waste vehicle loads will be visually characterized.

Table 3. C&D/Bulky Self-Haul Material Categories

Material Category	Examples
Concrete	Cinderblocks, concrete chunks/debris
Brick	Clay or limestone bricks for masonry, walls, pavements
Rock	Stones, pebbles, slate, gravel
Gypsum Board	Drywall chunks/debris, sheetrock
Insulation	Mineral wool, fiberglass, natural fiber insulation
Clean Engineered Wood	Wooden boards, pallets
Treated Wood	Stained or painted wood
Rebar	Reinforcing steel bars
Other Metal	Other metal scraps non-categorized
Asphalt Roofing	Asphalt shingles
Asphalt Paving	Broken chunks of asphalt
Carpet & Carpet Padding	Carpets and rugs, padding & non-slip grips
Mattresses/box springs	Mattresses/mattress materials and box springs
Furniture	Couches, chairs, dining tables, etc.
Yard Trash	Grass, leaves, brush, sticks and twigs
Food Waste	Food scraps, rotten food, meat, fruit, vegetables, etc.
Other Organic (Wood)	Furniture such as couches, wooden tables or chairs, cabinets, shelves
Bulky Waste	Bulky materials that do not fit other categories

Material Category	Examples
White Goods	Large electrical appliances such as refrigerators, washing machines, microwaves
Non-Ferrous Metals	Aluminum cans, pans, scraps; brass, copper, or other alloys not containing iron
Ferrous Metals	Wire coat hangers, nails, screws, auto parts, and other magnetic items
Textiles	Clothing, linens, leather, synthetic fibers, blankets, rubber
Tires	Automobile, bicycle, wheelbarrow or other tires
HHW	Compact fluorescent lightbulbs, fluorescent tubes, household cleaners, medical waste
Special	Household batteries, electronics, latex paint
Rigid Plastics	Hard plastic toys, outdoor chairs, large containers
PVC Pipe	Thermoplastic resin commonly used for manufacturing sewage pipes, water mains and irrigation
Plastic Film	Thin plastic wrap or food packaging (NO trash bags)
Miscellaneous or Bagged MSW	Commingled waste/scraps, otherwise not categorized

3 PROJECT DURATION AND NUMBER OF SAMPLES

We anticipate field activities for each of four seasonal waste characterization events between Summer 2022 and Spring 2023. Scheduling of field activities should take into consideration normal waste generation conditions to obtain representative samples. The scheduling of field activities should be done when sufficient quantities of waste and recyclable materials are expected to be delivered to the host facility.

SCHEDULE AND NUMBER OF SAMPLES

Table 4 below presents the waste streams to be analyzed by season along with the anticipated number of samples to be characterized.

Table 4. Anticipated Schedule and Number of Samples

Season	Waste Stream (Method of Characterizing Samples)			
	MSW (Manual)	**Recyclables (Manual)**	**C&D (Visual)**	**Bulky Waste (Visual)**
Summer August/September 2022	50 samples (WNB)	20 samples (Reuters)	60 samples (BCL)	--
Fall December 2022	30 samples (WNB)	--	60 Samples (BCL)	20 samples (WNB)
Winter February 2023	50 Samples (WNB)	30 samples (Reuters)	60 samples (BCL)	--
Spring April 2023	20 samples (WNB)	--	60 samples (BCL)	20 samples (WNB)
Total	**150 samples (45 COM 105 RES)**	**50 samples (RES)**	**240 samples (COM)**	**40 samples**

Note:

- WNB is Wheelabrator North Broward Transfer Station
- Reuters is Reuters Recycling Facility
- BCL is Broward County Landfill

SITE AND SCS REQUIREMENTS

SCS will provide the following to complete this study for each of the anticipated four seasons:

- Labor to conduct sorting/characterization activities, which includes a minimum of two experienced SCS professionals and six workers from a temporary labor agency
- Personal protective equipment for all SCS staff and subcontractors (to be identified in the Site Specific Health and Safety Plan)
- Sorting equipment including sorting table, containers, tarpaulins, scales, and other equipment to accurately sort waste and record the data

SCS requires the site operator to provide the location for the sampling and sorting activities. SCS requests the following support from the owner or operator of the facility where field activities will occur.

- A safe work area that is covered and at least 20' x 20' and separated/isolated from facility operations;
- Access to waste/recyclable/C&D materials delivered to the facility for sample selection and sorting;
- Use of bathroom facilities with running water in close proximity to designated sorting location;
- An open-air/outside location or break room where our team can take a break;
- Dedicated equipment operator that can work with the SCS Sampling Manager to obtain samples from discharged loads and transport of the materials to the sorting location;
- Direct contact information for someone located at the facility that can be reached quickly for questions or in case of an emergency.

SCS will manually characterize up to ten samples of waste or source-separated recyclable material per day for each day in the field. Our plan is designed to collect more samples than required for statistical confidence. Hence, if there are some disruptions during fieldwork which prevent 10 samples per day, the results will still be statistically valid.

The number of samples taken from each generating sector for both waste and recyclable materials will be established in the sampling plan. The distribution of samples will be based on material generation quantities from each sector. The specified approach will be to obtain one waste sample per targeted vehicle, although multiple samples from a vehicle may be required due to the frequency of truck traffic and the limited number of days in the field.

4 DATA ANALYSIS

DATA REDUCTION AND ANALYSIS

SCS will complete the following activities upon conclusion of the field activities:

1. Perform all data entry and analysis.
2. Conduct quality control measures to confirm accuracy of data entered.
3. Provide standard statistical analysis to estimate the mean composition (weight and percent), standard error, and confidence intervals at the ninety percent (90%) confidence level for each material stream, category, generating sector, and the County as a whole.

Following field activities, SCS staff will enter data recorded on the data sheets into a customized database and review it for data entry errors. The data entered will be verified for accuracy and adherence to hand-written sampling forms. We will calculate composition estimates using the ratio of the material's weight to the total sample weight.

WASTE COMPOSITION PROFILES

To develop waste characterization and quantity profiles for this study, three main steps will be taken as follows:

1. Convert volumetric estimates of materials to weight for the visually characterized C&D and Bulky Waste samples.
2. Calculate the estimated composition of each sample based on the sample weight.
3. Combine the results for individual streams (MSW, recycling, C&D, Bulky Waste) to produce a waste composition profile for each.

Converting Volumes to Weights

The composition calculations rely on the availability of individual material weights for each sample. SCS will convert volume estimates to weights using accepted waste density conversion factors using the following formula:

$$c = m \text{ x } v \text{ x } d$$

where:

c = the total weight of the specific material in the sample
m = percentage estimate of the material
v = total volume of the sample (in cubic yards)
d = density conversion of the material (in pounds/cubic yard)

Composition Calculations

Within each sample, the composition estimates represent the **ratio of the material's weight to the total sample weight**. For each material type, the individual sample percentages for that material are averaged.

Once data are entered, the composition of each waste sample will be calculated. The waste composition calculations represent the ratio of the components' weight to the total sample weight for each material component sorted.

Composition estimates are derived by summing each component's weight across all of the relevant samples and dividing by the sum of the total weight of waste, as shown in the following equation:

$$r_j = \frac{\sum_i c_{ij}}{\sum_i w_i}$$

where:

r	=	the ratio of the material component weight to the total weight of the waste samples
c	=	weight of particular material component
w	=	sum of all component weights for i = 1 to n, where n = number of selected samples and j = 1 to m, where m = number of material components

The confidence interval for this estimate is derived in two steps. First, the variance around the estimate was calculated, accounting for the fact that the ratio included two random variables (the component and total sample weights). The variance of the ratio estimator equation follows:

$$Var_{r_j} = \left(\frac{1}{n}\right) \cdot \left(\frac{1}{\overline{w}^2}\right) \cdot \left(\frac{\sum_i \left(c_{ij} - r_j w_i\right)^2}{n-1}\right)$$

where:

$$\overline{w} = \frac{\sum_i w_i}{n}$$

(Note: the standard deviation is the square root of the variance term.)

Second, confidence intervals at the 90% confidence level are calculated for a component's mean as follows:

$$r_j \pm \left(t \cdot \sqrt{Var_{r_j}}\right)$$

where:

t = the value of the t-statistic corresponding to a 90% confidence level

SCS will prepare material characterization profiles for the County based on the data obtained. The profiles will be organized as follows:

1) Material Stream (i.e. MSW, recyclable materials, bulky, and C&D) – SCS will develop sector-specific waste characterization profiles for each material stream designated by the County. This will be done by aggregating the waste composition data from each sample within that stream.
2) Generating Sector (residential and commercial) – For the material streams where specific samples of residential and commercial materials are sampled and sorted, SCS will prepare separate material profiles for both residential and commercial.

5 FINAL REPORT

SCS will prepare and submit the final project report that includes the study's data and results. The final report will consist of information obtained during field activities and analysis of the data and results. The major sections of the final report will include:

- Executive Summary
- Background
- Methods
- Results
- Conclusion
- Appendices (including sampling plans, site specific health and safety plans, etc.)

SCS can modify the major sections of the final report based on the requirements of the County. Study results will be presented in the following ways:

- Circle graphs indicating the proportion of waste for each major material category
- Circle graphs that show the proportion of each individual material type
- Detailed composition tables that present the estimated proportion of each material type present in each material stream and the confidence interval surrounding each estimate

SCS will submit draft report to the County for review and comment. We will update the report and submit the final version that incorporates the County's comments.

Appendix
Field Data Forms

MSW Sampling/Sorting Form

SCS ENGINEERS

BROWARD COUNTY SOLID WASTE COMPOSITION STUDY

SAMPLE INFORMATION:	RANDOM SEGMENT:	# OF CANS:
SAMPLE NUMBER:	PHOTO	

VEHICLE INFORMATION: DATE/TIME:

HAULER_____ TRUCK #_____ TRUCK TYPE_____COLLECTION LOCATION _____

SORT DATA			
PAPER			
Compostable Paper		Magazines	
Newspaper		Mixed Paper	
Corrugated Cardboard		Aseptic Containers	
Office Paper			
PLASTIC			
#1 PET Bottles		Rigid Plastics	
#2 HDPE Natural Containers		Shrink Wrap	
#2 HDPE Color Containers		Grocery Store Bags	
Other Mixed Plastic Containers		Plastic Films	
Polystyrene			
METALS/GLASS			
Non-Ferrous Metals		Aluminum Cans	
Ferrous Metals		Glass	
Steel Cans			
ORGANIC MATERIALS			
Food Waste		Yard Trash	
Other Organic (Wood)		Textiles	
Other Uncategorized			
BULKY/C&D			
Concrete		Other Metal	
Brick		Asphalt Roofing	
Rock		Asphalt Paving	
Gypsum Board/Drywall		Carpet & Carpet Padding	
Insulation		Mattress/Box Springs	
Clean Engineered Wood		Bulky Waste	
Treated Wood		White Goods	
Rebar		PVC Pipe	
OTHER WASTE			
Tires			
HHW			
Special Waste			
Miscellaneous			

COMMENTS/OBSERVATIONS:

Recycling Sampling/Sorting Form

SCS ENGINEERS

BROWARD COUNTY SOLID WASTE COMPOSITION STUDY - 2022

SAMPLE INFORMATION:	RANDOM SEGMENT:	# OF CANS:
SAMPLE NUMBER:	PHOTO	

VEHICLE INFORMATION: DATE/TIME:

HAULER_____ TRUCK #_____ TRUCK TYPE_____COLLECTION LOCATION _____

SORT DATA	
PAPER	
Newspaper	
Corrugated Cardboard	
Office Paper	
Magazines	
Mixed Paper	
Aseptic Containers	
PLASTIC	
#1 PET Bottles	
#2 HDPE Natural Containers	
#2 HDPE Color Containers	
Other Mixed Plastic Containers	
Polystyrene	
Grocery Store Bags	
Plastic Films	
METALS/GLASS	
Glass Containers	
Steel Cans	
Aluminum Cans	
OTHER WASTE	
Residue	

COMMENTS/OBSERVATIONS:

C&D Visual Characterization Form

SCS ENGINEERS

BROWARD COUNTY CONSTRUCTION/DEMOLITION (CDD) COMPOSITION STUDY

SAMPLE INFORMATION:

SAMPLE NUMBER: PHOTO

VEHICLE INFORMATION: DATE/TIME:

HAULER_____ TRUCK #_____ TRUCK TYPE_____COLLECTION LOCATION _____

SORT DATA

General	Concrete	
	Brick	
	Rock	
	Gypsum Board	
	Insulation	
	Asphalt Roofing	
	Asphalt Paving	
Plastic	Rigid Plastics	
	PVC Pipe	
	Plastic Film	
Wood	Clean Engineered Wood	
	Treated Wood	
	Other Wood	
Metal	White Goods	
	Non-Ferrous Metals	
	Ferrous Metals	
	Rebar	
	Other Metal	
Textiles	Textiles	
	Carpet & Carpet Padding	
	Mattresses/Box Springs	
	Furniture	
Organic	Yard Trash	
	Food Waste	
Special	Tires	
	HHW	
	Special Waste	
Other	Corrogated Cardboard	
	Bulky Waste	
	Miscellaneous/Bagged MSW	

COMMENTS/OBSERVATIONS:

Appendix K

Task 6 White Paper – Findings and Recommendations

Solid Waste Authority of Broward County, Florida

Task 6 White Paper: Recommendations and Findings

Solid Waste Authority of Broward County
115 South Andrews Avenue, Room 122
Fort Lauderdale, FL 33301
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SCS ENGINEERS

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Appendix A Identified Potential Sites
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1.0 INTRODUCTION

Broward County (County) entered into an Interlocal Agreement (ILA) in 1987 with 26 municipal cities, which created the Resource Recovery Board (Board) and Resource Recovery System (System). The ILA expired in 2013, leaving all parties individually responsible to administer contracts for the disposal of their solid waste streams, or to enter into new agreements under new conditions. Legal action ensued after the ILA expiration related to the equitable distribution of Board assets among the members. On April 7, 2015, Broward County and the Board/System settling parties entered into a settlement agreement, which resolved litigation over the distribution of assets and the liabilities resulting from the expiration of the ILA and resulted in an equitable distribution of $32 million to the municipal members of the System.

On June 14, 2016, the first amendment to the settlement agreement was entered, which delayed the sale of the Alpha 250 site. The purpose of the delay was to allow the cities and Broward County to perform a study of various solid waste and recycling issues. Specifically, the first amendment stipulated that the study evaluate and provide recommendations regarding the following:

1. How a 75 percent countywide recycling goal may be reached.

2. Whether retaining public ownership of Alpha 250 would facilitate the meeting of that recycling goal or would provide other benefits in connection with solid waste disposal within Broward County.

3. General solid waste disposal issues as determined by the SWWG (as defined below) which may include options regarding flow control and potential governance or contractual structures for collaborative management of solid waste disposal.

In 2018, Arcadis, U.S., Inc. and Kessler Consulting, Inc. developed a Solid Waste and Recycling Issues Study (Study) which provided recommendations on various matters, including reaching a 75% countywide recycling goal, retaining ownership of public land for the construction of solid waste or recycling facilities, and other supplemental approaches to solid waste management (WM). In response to recommendations provided in the Study, a Solid Waste Working Group (SWWG) consisting of eight municipal members and one County member, was established to create a framework for an independent governing entity comprised of the County and municipalities that would develop and implement a cooperative approach to managing solid waste and recycling.

The SWWG worked together to develop an ILA creating the Solid Waste and Recyclable Materials Processing Authority of Broward County, Florida (Authority), which was presented to all municipalities in the County throughout the Summer of 2023. Twenty-eight municipalities and the County executed the ILA and agreed to participate in the Authority.

One of the Authority's first orders of business was to develop a Regional Solid Waste and Recycling Master Plan (Master Plan) that will serve as the foundation for the future of the Authority. In order to develop an informed Master Plan, the SCS Team has conducted several studies. The Task 2 Existing Resources White Paper evaluated and described existing solid waste disposal and recycling processes and resources currently in operation in Broward County and developed a Solid Waste Mass Balance model (SWMB or Model) which estimated the tonnage of solid waste and recyclable materials generated within the County and tracked the flow of waste through the Authority's solid waste system and out-of-County disposal facilities, encompassing four key phases: Generation, Collection, Transfer/Routing, and Diversion/Disposal.

Using the Model-estimated solid waste and recyclable material tonnage, the Task 4 Future Needs Assessment White Paper identified the needs of the future waste management system in order to enhance waste diversion and disposal, with the goal of achieving a 75% or higher recycling rate. Five modeled solid waste scenarios were developed and are summarized in **Table 1** below.

Table 1. Modeled Solid Waste Scenarios

Scenario	Programs	Additional Facility Needs and Capacity of Each Facility Tons Per Year (TPY)	Target Diversion Rate Increase
Scenario A	• Reduce MSW 1x/week • Restore Recycling Services to 20% of Broward County • Add Curbside Yard Waste (YW) Collection • Add Food Waste (FW) Drop-Off Events • Add Permanent Household Hazardous Waste (HHW)/Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and relevant diversion programs and policies.	• Two (2) Single- Stream Material Recovery Facilities (250,000 tons per year (TPY) each • Two (2) New Organics Processing Sites with: Two (2) Mulch/ Colorizing Operations (175,000 TPY each) and One (1) New Biochar Pyrolysis operation (30,000k TPY) • Two (2) Construction and Demolition (C&D) Recovery Facilities (450,000 TPY each) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • One (1) Landfill	+25 percentage points to 62%
Scenario B	• Reduce MSW 1x/week • Restore Recycling Services to 20% of Broward County • Add Curbside Yard Waste (YW) Collection • Add Opt-In Curbside Food Waste (FW) Composting Collection • Add Permanent HHW/Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and relevant diversion programs and policies. • Add new WTE capacity	• Two (2) Single Stream Material Recovery Facilities (250,000 TPY each) • Two (2) New Organics Processing Sites with: Two (2) (Mulch/ Colorizing) operations – (175,000 TPY), one (1) Covered Aerated Static Pile (CASP) composting operation (36,000 TPY FW + 37,000 TPY YW) And One (1) New Biochar Pyrolysis operation (30,000 TPY) • Two (2) C&D Recovery Facilities (450,000 TPY each) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • One (1) New WTE Facility (1M TPY) with Advanced Metals Recovery (AMR) • One (1) Landfill	+42 percentage points to 79%

Scenario	Programs	Additional Facility Needs and Capacity of Each Facility Tons Per Year (TPY)	Target Diversion Rate Increase
Scenario C	• Reduce MSW 1x/week • Restore Recycling Services to 20% of Broward County • Add Curbside Co-Collection of Yard Waste (YW) and Food Waste (FW) for Composting • Add Permanent HHW/Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and diversion programs and policies. • Add new WTE capacity	• Two (2) Single Stream Material Recovery Facilities (250,000 TPY each) • Two (2) New Organics Processing Sites with: Ten (10) CASP composting operations (36,000 TPY FW + 37,000 TPY YW) each and One (1) Biochar Pyrolysis operation (30,000 TPY) • Two (2) C&D Recovery Facilities (450,000 TPY each) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • One (1) New WTE Facility (1M TPY) with AMR • One (1) Landfill	+46 percentage points to 83%
Scenario D	• Convert MSW (2x/week) to Wet MSW (2x/week) • Convert Recycling to Dry MSW (1x/week) • Add Curbside Yard Waste (YW) Collection • Add Permanent HHW/Electronics/Recycling Drop-Off Sites • Add reduction, reuse, and relevant diversion programs and policies.	• Six (6) Dry Material Recovery Facilities (160,000 TPY each) • Three (3) New AD Organics Facilities for Wet Waste (160,000 TPY each) • Two (2) New Organics Processing Sites with: Two (2) (Mulch/ /Colorizing) operations (175,000 TPY each) and One (1) Biochar Pyrolysis operation (30,000 TPY) • Two (2) C&D Recovery Facilities (450,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • One (1) Landfill	+14 percentage points to 51%

Scenario	Programs	Additional Facility Needs and Capacity of Each Facility Tons Per Year (TPY)	Target Diversion Rate Increase
Scenario E	• Reduce MSW to 1x/week • Restore Recycling Services to 20% of Broward County • Add Curbside Co-Collection of Yard Waste (YW) and Food Waste (FW) for Composting • Add Permanent HHW/ Electronics/ Recycling Drop-Off Sites • Add reduction, reuse, and diversion programs and policies.	• Two (2) Single Stream Material Recovery Facilities (250,000 TPY each. • Two (2) New Organics Processing Sites with: Ten (10) CASP operations (36,000 TPY FW + 37,000 TPY YW) and One (1) Biochar Pyrolysis Facility (30,000 TPY) • Three (3) MWP Facilities (330,000 TPY each) – Single Stream Extraction – Fiber Extraction – AD • Two (2) C&D Recovery Facilities (450,000 TPY each) • Eight (8) Permanent Drop-Off Centers (12,000 TPY each) • Three (3) Transfer Stations (North, South, Central Broward County) • One (1) Landfill	+36 percentage points to 73%

1.1 GOALS

The intent of this Task 6 Recommendations and Findings White Paper is (1) to review the feasibility of using publicly-owned or municipally-owned sites, including the Alpha 250 parcel, for siting and constructing any of the solid waste, recycling, and diversion facilities identified in the Task 4 Future Needs Assessment scenarios summarized in Table 1 above; and (2) identify potential health and other human and ecological impacts associated with these sites.

This Task 6 White Paper also considers opportunities for regional partnerships for solid waste management, provides recommendations for other portions of the solid waste stream that could be managed or harvested to reduce the volume of waste disposed at landfills, and identifies the advantages and disadvantages of increasing the waste processing capacity of the Win Waste South Broward Resource Recovery Facility (South Broward RRF) and development of a separate Waste-to-Energy (WTE) facility at a reasonable alternative site.

2.0 SITE FEASIBILITY

As part of the Task 4 White Paper, the SCS Team identified the types of facilities needed to manage Broward County's waste streams, as well as the capacity of each and the approximate minimum acreage required. Exclusionary screening criteria were developed in order to identify potential sites for each facility type. The criteria considered minimum site acreage, setback from residential zoning, access to major roadways, and ownership by a municipal government entity. **Table 2** provides a summary of the criteria used to assess the feasibility of potential sites within the County.

Each of the potential solid waste facility sites needs to undergo a detailed siting analysis that considers geotechnical subsurface conditions, environmental permitting, design analysis, constructability analysis, etc. These sites were identified based on the criteria noted in Table 2, however, ultimate suitability will depend on completion of a detailed siting analysis.

Table 2. GIS Exclusionary Criteria

Siting Criteria	Technology	SS RMPF	Mulch Facility	CASP	Biochar (YW)	Aerobic Digester (AD)	Organics Processing Campus – Scenario A	Organics Processing Campus – Scenario B	Organics Processing Campus – Scenario C	Organics Processing Campus – Scenario D	Organics Processing Campus – Scenario E	C&D RMPF	Dry MRF	MWP (Fiber Extraction, AD, & MRF)	Public Drop-Off Recycling Center	Transfer Station	WTE	Landfill
	Capacity Needed Per Facility (TPY)[1]	250,000	175,500	73,000[2]	30,000	160,000	380,000	470,000	930,000	860,000	930,000	450,000	160,000	330,000	12,000	1,240,000	1,000,000	3,400,000
Parcel Ownership	Must be publicly owned																	
Minimum Site Area for Individual Facilities (Ac) [3]		20	10	10	2	7	18	26	82	28	82	15	15	30	0.5	15	30	640
Offset from Residential Zoning		0.25 mi	0.25 mi	1.0 mi	0.5 mi	0.25 mi	0.5 mi	1.0 mi	1.0 mi	0.5 mi	1.0 mi	0.5 mi	0.25 mi	0.5 mi	NA	0.25 mi	0.5 mi	1.0 mi
Number of Facilities Required by Scenario		2 (Scenarios A, B, C, E)	2 (Scenarios A, B, D)	1 (Scenario B), 10 (Scenarios C and E)	1 (All Scenarios)	3 (Scenario D)						2 (All Scenarios)	6 (Scenario D)	3 (Scenario E)	8 (All Scenarios)	3 (All Scenarios)	1 (Scenarios B, C)	1 (All Scenarios)
Zoning	Vacant, Industrial, Commercial, and Agricultural.																	
Transportation - Travel Time to Major Road	Exclude properties more than five miles from a Collector or Arterial Road.																	
Proximity to Airport	NA																>4 miles	>4 miles
Broward County Wellfield Protection Zones[4]	Exclude properties within wellfield protection zones.																	

1. The modeled functional capacities from the Task 4 White Paper for each type of solid waste facility were estimated based on the requirements to meet the Authority's 2045 diversion goals, based upon modeled waste volumes anticipated.
2. Capacity is 90,000 TPY when the required bulking agent is added.
3. Minimum site acreage shown is for the minimum functional facility footprint that could accommodate the capacity required to meet long-term Authority objectives and does not include appurtenant scales, access and egress roads, local zoning requirements, setbacks, vegetation, fencing, stormwater, etc., which would be determined during a fatal flaw analysis.
4. The Broward County Wellfield Protection Program was established to protect areas around public and private wellfields. Sites located within Wellfield Protection Zones were excluded from consideration.

2.1 IDENTIFICATION OF SITES – EXCLUSIONARY CRITERIA

In order to identify the availability of potential sites for the development of future solid waste, recycling, and diversion facilities within the County, the SCS Team conducted a desktop evaluation utilizing Geographic Information Systems (GIS), which applied the following exclusionary criteria:

- Filtered Surface Water Class Boundaries, lines and areas, for Class 1
- Ran buffer 3,000 ft from Class 1 surface waters (lines and areas)
- Filtered USA Flood Hazard Reduced Set for 1% Annual Chance Flood Hazard
- Created a 4 statute-mile buffer around public airports
- Joined Broward County parcels with tax roll data
- Dissolved the parcels by owner, exploded, and calculated acreages by owner
- Removed all parcels owned by SFWMD, FDOT and any parcels that fell within CERP boundary
- Removed all parcels less than 5-acres in size.
- Removed parcels that coincided with floodplain, and wellfield protection zones. Added wetlands for parcel selection based on facility type.
- During evaluation, recreational facilities/areas with open space (e.g. sport fields, golf courses, forests, parks) were excluded but may warrant further consideration in the future in the absence of other suitable parcels.
- Evaluated remaining parcels based on Department of Revenue (DOR) codes, eliminated residential DOR codes (00-09) and prioritized: Vacant (10, 40, 80), Commercial (10-39), Agricultural (50-69) and Industrial (40-49).
- Pulled publicly-owned and municipally-owned parcels for further evaluation by including the words “City,” “County,” “Hospital,” “Water,” and “School” in the ownership field.
- Utilized the US Fish and Wildlife and Florida Fish and Wildlife GIS layer to confirm if known threatened and endangered species features or locations fell within the parcels identified.
- Added fields to evaluate suitability of parcel by facility type:
    - Floodplain (In/Out)
    - Residential Zoning Buffer (In/Out 1.0 mi, 0.5 mi, 0.25 mi)
- Ungrouped publicly and municipally-owned parcels and removed individual parcels based on encroachment of residential buffer within the minimum 0.25-mile setback, which resulted in identifying a parcel that was less than 5 acres in size.
    - Proximity to major roadway (Less than or greater than 5 miles)
        - Note that all parcels fell within 5 miles of a major roadway
    - Filtered dataset to include only parcels owned by Broward County or a municipal government entity

The desktop GIS analysis resulted in the identification of 132 individual publicly or municipally-owned parcels, that were grouped into 48 potential sites. Each potential site was assigned a letter site identifier. Review of the GIS data and siting criteria associated with each proposed facility type were considered and evaluated for each of the 48 potential sites. This resulted in many parcels being excluded from further evaluation. Ultimately eight potential sites were identified for further evaluation for the development of a solid waste management facility/facilities identified in the Task 4 White Paper. Appendix A provides the details associated with each of the 48 potential sites and the GIS exclusionary criteria that resulted in the parcel being excluded from consideration, as applicable.

After this evaluation was completed, Broward County provided a listing of 80 additional parcels for consideration, of which 32 were included in the original evaluation. The additional parcels were evaluated utilizing the same methodology described above. All but one, Site Identifier Broward A, were excluded from further evaluation. Appendix B provides the details associated with the 80 additional parcels provided by Broward County, and the GIS exclusionary criteria that resulted in the parcel being excluded from consideration, as applicable. **Table 3** summarizes the acreage of each site identified, along with the general location and **Figure 1** shows the location of each site within Broward County.

Table 3. Summary of Potential Sites

Site Identifier	Ownership	Location	Site Size (Acreage)
AA	Unincorporated Broward County	East of Ft. Lauderdale International Airport, South of I-595	8.58
DD	Unincorporated Broward County	West of Ft. Lauderdale International Airport, South of I-595	7.88
E (Includes the Alpha 250 Parcel)	City of Pompano Beach	East of the FL Turnpike, South of Sample Road	27.89
EE	Unincorporated Broward County	West of I-95, South of I-595	42.19
W	Unincorporated Broward County	East of Ft. Lauderdale International Airport, East of NW 7th Ave	6.13
OO	Unincorporated Broward County	East of I-75, North of Sheridan Street	65.57
U	City of Hollywood.	Southwest of Port Everglades, South of Eller Dr.	3.59
Z	Unincorporated Broward County	East of Ft. Lauderdale International Airport, East of NW 7th Ave	19.51
Broward A	Unincorporated Broward County	South of Ft. Lauderdale International Airport, North of NE 10th St	6.87

Figure 1. Location of Publicly and Municipally-Owned Sites within Broward County which Meet Screening Criteria

2.2 SUMMARY OF POTENTIAL SITES

The desktop GIS analysis identified nine sites that could potentially accommodate development of a SS RMPF, Mulch Facility, Biochar, AD, Scenario A - Organics Processing Campus, C&D RMPF, Dry MRF, Public Drop-Off Recycling Center, and Transfer Station. Due to the residential zoning offset and minimum site acreage requirement, publicly or municipally-owned sites were not identified for the development of a CASP, Scenario B through E Organics Processing Campus, MWP (Fiber and other Post-Consumer Packaging Extraction), WTE, and Landfill. **Table 4** summarizes the identified sites by facility type.

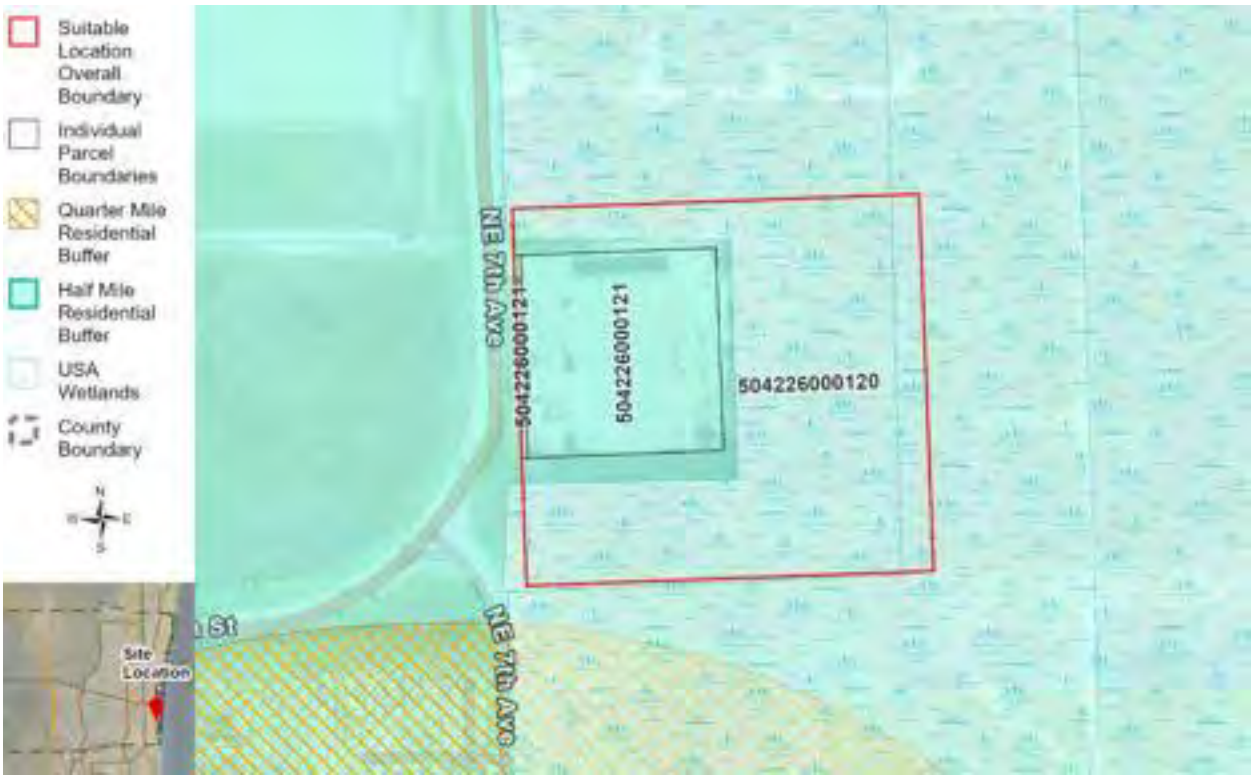
Table 4. Identified Sites by Facility Type

Facility Type	Facility Capacity (TPY)	Identified Site
SS RMPF	250,000	E, EE, OO, Z
Mulch Facility	175,000	E, EE. OO, Z
CASP	73,000	No Sites Identified
Biochar	30,000	Z
AD	160,000	AA, DD, E, EE, OO, Z
Organics Processing Campus – Scenario A (Much and Biochar Facilities)	450,000	Z
Organics Processing Campus – Scenario B (Mulch, CASP and Biochar Facilities)	380,000	No Sites Identified That Meet Existing Criteria
Organics Processing Campus – Scenario C (CASP and Biochar Facilities)	470,000	No Sites Identified That Meet Existing Criteria
Organics Processing Campus – Scenario D (Mulch and Biochar Facilities)	930,000	No Sites Identified That Meet Existing Criteria
Organics Processing Campus – Scenario E (CASP and Biochar Facilities)	860,000	No Sites Identified That Meet Existing Criteria
C&D RMPF	930,000	Z
Dry MRF	160,000	E, EE, OO, Z
MWP (Fiber Extraction, AD, & MRF)	330,000	No Sites Identified that Meet Existing Criteria
Public Drop-Off Recycling Center	12,000	AA, DD, E, EE, W, OO, U, Z, Broward A
Transfer Station	1,240,000	E, EE, OO, Z
WTE	1,000,000	No Sites Identified that Meet Existing Criteria
Landfill	3,400,000	No Sites Identified that Meet Existing Criteria

2.2.1 Site AA

Site AA is publicly-owned, approximately 8.58 acres in size, and is within Unincorporated Broward County. An existing structure associated with car rentals is directly west of this site; however, solid waste services could be co-located if the site is deemed appropriate for development. This site is 0.25 miles from residential zoning and, based on review of the National Wetlands Inventory (NWI) GIS layer that is maintained by the U.S. Fish and Wildlife Services (USFWS) and appears to have environmentally sensitive lands. Site AA is located east of Ft. Lauderdale International Airport, approximately 2 miles east of I-95 and 1.2 miles southeast of I-595. The site does not have existing access to major roadways, but access could be developed. Based on the site size and residential zoning set back, the site could be used to develop an AD, or Public Drop-Off Recycling Center.

Figure 2. Site AA Site Map



2.2.2 Site DD

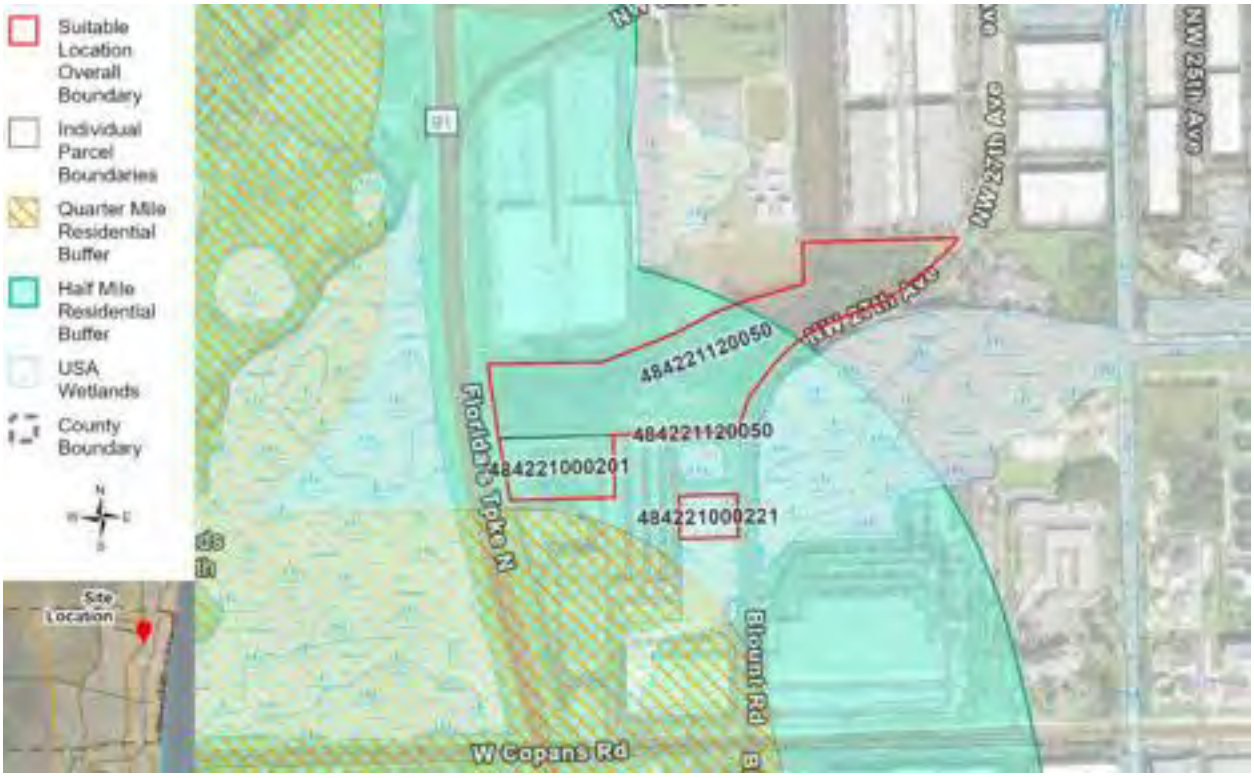
Site DD is publicly-owned, approximately 7.88 acres in size and is within Unincorporated Broward County. This site is 0.25 miles from residential zoning and, based on review of the NWI GIS layer, appears to have environmentally sensitive lands on a portion of the site. Site DD is located approximately 0.1 miles east, and 1.1 miles south of I-95, and I-595, respectively, and is west of Ft. Lauderdale International Airport. Access to existing major roadways would need to be developed but are nearby. Based on the site size and residential zoning set back, the site could be utilized to develop an AD or Public Drop-Off Recycling Center.

Figure 3. Site DD Site Map

2.2.3 Site E

Site E is publicly-owned by Broward County, approximately 27.89 acres in size, and is within the City of Pompano Beach. Site E includes the North Alpha 250 parcel, which is owned by the former RRS, as well as two County-owned parcels located directly south. This site is 0.25 miles from residential zoning and includes undeveloped vegetated land, but it does not appear to be environmentally sensitive based on review of the NWI GIS layer. Site E is located approximately 0.2 miles east of the Florida Turnpike, 0.6 miles south of Sample Road, and 0.1 miles west of Blount Road. Access to major roadways does not currently exist but could be developed. Based on the site size and residential zoning set back, the site could be used to develop a SS RMPF, Mulch Facility, AD, Dry MRF, Transfer Station, or Public Drop-Off Recycling Center. Note that this potential site includes the Alpha 250 parcel, which has known zoning and development limitations, which are further discussed in Section 3.

Figure 4. Site E Site Map



2.2.4 Site EE

Site EE is publicly-owned, approximately 42.19 acres in size, and is located within Unincorporated Broward County. This site is 0.25 miles from residential zoning and includes undeveloped vegetated land but does not appear to be environmentally sensitive based on review of the NWI GIS layer. Site EE has an existing borrow lake located in the central portion of the site; the lake would need to be filled in order to accommodate development of a solid waste facility or co-locate multiple solid waste facilities. This site is located approximately 0.2 miles west, and 0.5 miles south of I-95 and I-595, respectively. Access to major roadways does not currently exist but could be developed. Based on the site size and residential zoning set back, the site could be used to develop a SS RMPF, Mulch Facility, AD, Dry MRF, Transfer Station, or Public Drop-Off Recycling Center.

Figure 5. Site EE Site Map

2.2.5 Site W

Site W is publicly-owned, approximately 6.13 acres in size, and is within Unincorporated Broward County. This site is 0.5 miles from residential zoning, and, based on review of the NWI GIS layer, environmentally sensitive lands are not present. The site currently appears to be used as a parking lot. This site is located approximately 0.5 miles east of Ft. Lauderdale International Airport, 0.4 miles south of I-595, directly east of NE 7th Ave. Transportation access points connecting the site to NE 7th Ave already exist, however, roadway upgrades would likely be required. Based on the site size and residential zoning set back, the site could be utilized to develop an AD, and/or Public Drop-Off Recycling Center.

Figure 6. Site W Site Map

2.2.6 Site OO

Site OO is publicly-owned, approximately 65.57-acres in size, and is within Unincorporated Broward County. This site is 0.25 miles from residential zoning and includes undeveloped vegetated land but does not appear to be environmentally sensitive based on review of the NWI GIS layer. This site is located approximately 1.1 miles east of I-75, 3.9 miles west of I-95, and is directly north of Sheridan Street. Access to Sheridan Street already exists but will likely require further development. Based on the site size and residential zoning set back, the site could be utilized to develop a SS RMPF, Mulch Facility, AD, Dry MRF, Transfer Station, and/or Public Drop-Off Recycling Center.

Figure 7. Site OO Site Map

2.2.7 Site U

Site U is municipally owned, approximately 3.59 acres in size, and is within the City of Hollywood. This site is 0.25 miles from residential zoning and appears to be used for Port Everglades operations. This site is located 0.1 miles southwest of Port Everglades, approximately 1.1 miles east of I-595, and is directly east of SE 18th Ave. Transportation access points connecting the site to SE 18th Ave already exist but will likely require further development. Based on the site size and residential zoning set back, the site could be used to co-locate a Public Drop-Off Recycling Center with existing Port Everglades operations.

Figure 8. Site U Site Map

2.2.8 Site Z

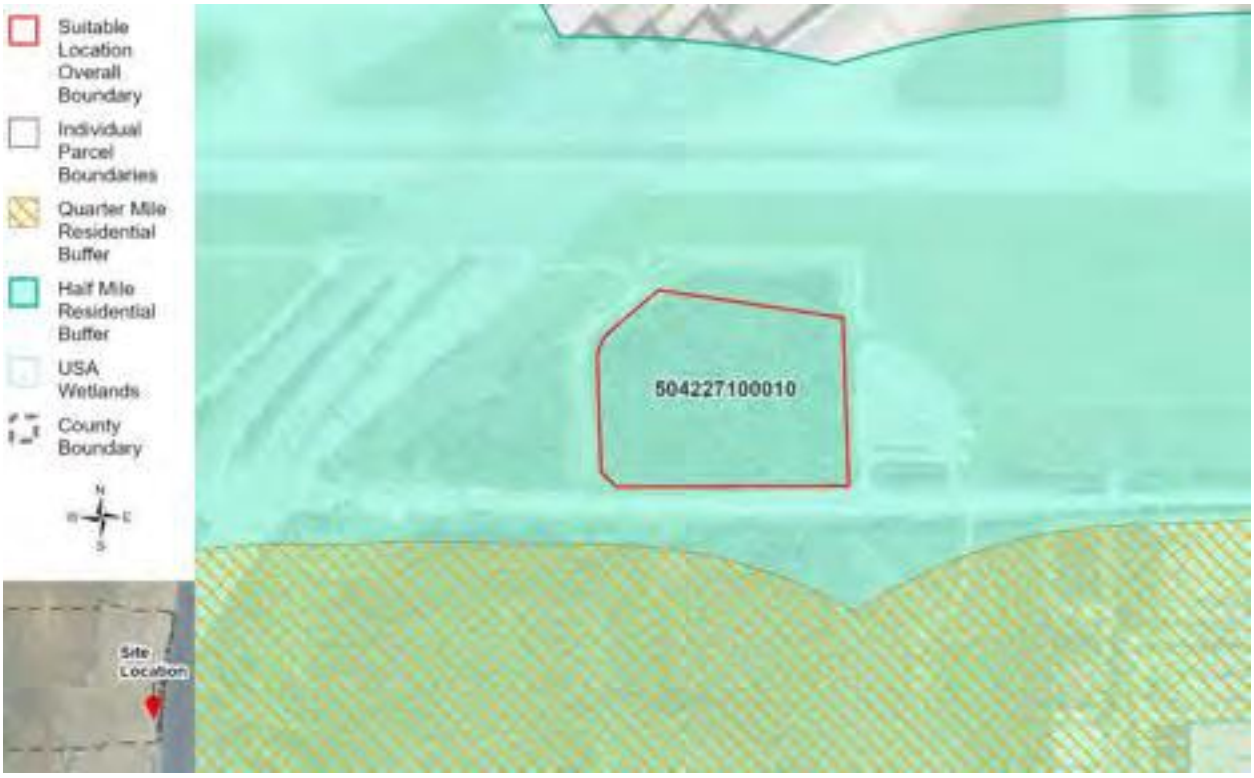
Site Z is publicly-owned, approximately 19.51-acres in size, and is within Unincorporated Broward County. This site is 0.50 miles from residential zoning and, based on review of the NWI GIS layer, appears to have environmentally sensitive lands that have not been previously developed. The site is located approximately 1.1 miles southeast of I-595, 0.5 miles east of Ft. Lauderdale International Airport, directly east of N.E. 7th Ave. Access to major roadways does not currently exist but could be developed. Based on the site size and residential zoning set back, the site could be utilized to develop a Scenario A Organics Processing Campus (Mulch and Biochar Facilities), SS RMPF, AD, C&D RMPF, Dry MRF, Transfer Station, and Public Drop-Off Recycling Center.

Figure 9. Site Z Site Map

2.2.9 Site Broward A

Site Broward A is publicly-owned, approximately 6.87-acres in size, and is within Unincorporated Broward County. This site is 0.25 miles from residential zoning and, based on review of the NWI GIS layer, does not appear to have environmentally sensitive lands but is vegetated. The site is located approximately 0.25 miles east of State Road 7 and 1.5 miles east of I-95, directly south of the Ft. Lauderdale International Airport, on SE 10th St (Taylor Rd). Access to major roadways exists but would likely require upgrades. Based on the site size and residential zoning set back, the site could be utilized to develop a Public Drop-Off Recycling Center.

Figure 10. Site Broward A Site Map



2.2.10 Potential Human and Environmental/Ecological Impacts

Utilizing any of the proposed sites for the development of the proposed solid waste facilities identified in the Task 4 White Paper will have both human and environmental/ecological impacts. Potential human and environmental/ecological impacts associated with the development of any solid waste facility are thoroughly reviewed during the permitting and regulatory approval process with each facility required to adhere to all pertinent local, state, and federal regulations to obtain construction and operating permits. The permitting process evaluates various human and environmental/ecological impacts while providing for a review framework that is data driven based on what is deemed to be an acceptable level of risk as established by local, state, and federal regulations.

For the purposes of this Task 6 White Paper, the potential preliminary human and environmental/ecological impacts associated with the development of the identified sites were determined based on a desktop GIS analysis, where the proximity of the following human and environmental/ecological impacts were identified:

- Distance to residential zoning (0.25 mile or greater)
- Proximity to Broward County wellfield protection zones
- Proximity to Class I surface waters
- Proximity to United States Fish and Wildlife Service critical and strategic habitat conservation areas
- Determination of potential wetland habitats based on USFWS NWI data
- Determination of potential presence of Threatened and Endangered Species based on Florida Fish and Wildlife Conservation Commission (FWS) Critical Habitat data

The following table and figures summarize the findings from the desktop GIS analysis; however, a detailed siting analysis of human and environmental/ecological impacts would need to be completed in order to confirm and quantify potential impacts.

Table 5. Preliminary Human and Environmental/Ecological Impacts

Site Identifier	Site Size (Acreage)	Distance to Residential Community (ft)	Wellfield Protection Zone[1]	Presence of Wetlands[2]	Known T&E Species[3]
AA	8.58	>0.25 miles	No	On-Site	None Noted
DD	7.88	>0.25 miles	No	On-Site	None Noted
E	27.89	>0.25 miles	No	On-Site	None Noted
EE	42.19	>0.25 miles	No	On-Site	None Noted
OO	65.57	>0.25 miles	No	None Noted	None Noted
U	3.59	>0.25 miles	No	None Noted	None Noted
W	6.13	>0.25 miles	No	None Noted	None Noted
Z	19.51	>0.25 miles	No	On-Site	None Noted
Broward A	6.87	>0.25 miles	No	None Noted	None Noted

1. The Broward County Wellfield Protection Program was established to protect areas around public and private wellfields. Sites located within Wellfield Protection Zones were excluded from consideration.
2. As determined based on the USFWS NWI GIS layer.
3. As determined based on the FWS Critical Habitat for Threatened and Endangered Species

2.2.11 Economically Located for all Authority Stakeholders

Based on the results of the GIS desktop analysis, utilizing exclusionary criteria, minimal sites were identified that could potentially be utilized to develop solid waste processing and disposal facilities within Broward County. **Figure 11**, below, shows the location of sites that were identified, and **Figure 12** shows the location of the potential sites in comparison to existing public, municipal, and privately-owned infrastructure. One site was identified in the northern portion of the County, one site was identified in the southwest portion of the County, and the remaining seven sites were identified in the southeast portion of the County. The sites identified are not centrally located to serve all Authority stakeholders, however, when combined with existing public, municipal, and private infrastructure, they could potentially be economically located to serve a portion of the nearby Authority stakeholder population centers, which is dependent on the facility type ultimately selected for development at the potential sites

Figure 11. Location of Potential Sites for Solid Waste Facility Development

Figure 12. Location of Potential Sites for Solid Waste Facility Development in Comparison to Existing Public, Municipal, and Private Solid Waste Infrastructure

3.0 ALPHA 250 UTILIZATION OPTIONS

The Alpha 250 site is composed of two parcels: a northern parcel and a southern parcel that are separated by Blount Road. The North Alpha 250 site is located east of the Florida Turnpike. The South Alpha 250 site is located east of Blount Road and was classified as a Natural Resource Area. A perpetual conservation easement was granted for the South Alpha 250 site; therefore, it cannot be developed for any purpose and is excluded from consideration for development.

3.1 ALPHA 250 SITE EVALUATION

In 2018, Arcadis, U.S., Inc. and Kessler Consulting, Inc. developed the Solid Waste and Recycling Issues Study (Study). As part of that Study, they developed general, non-site-specific criteria in order to determine if the solid waste processing facilities proposed as part of that Study could be developed at the Alpha 250 site. As part of this Task 6 White Paper, the SCS Team reevaluated zoning and available buildable land at the Alpha 250 site, which are summarized below.

3.2 CONFIRMATION OF LAND USE AND ZONING

As part of this analysis, the SCS Team confirmed the current land use and zoning designation of the North Alpha 250 site. The site is still within the City of Pompano Beach and falls within their zoning jurisdiction. The site is still zoned General Industrial Planned Industrial Overlay (I-1/PCI). Uses for areas with the General Industrial designation are defined in Appendix A: Consolidated Use Table of the City of Pompano Beach's Zoning Code. Waste-related uses are still allowed in areas with the General Industrial designation as a special exception and would require approval from the City of Pompano Beach Zoning Board of Appeals (ZBA). The following waste-related uses, as defined by the City of Pompano Beach, are allowed at the site (with special exceptions): Mulch Facility, CASP, AD, C&D RMPF, land clearing debris disposal facility, Dry MRF, MWP, Transfer Station, tire disposal or tire recycling facility, and WTE.

3.3 NORTH ALPHA 250 SITE AVAILABLE BUILDABLE AREA

The Site has a total size of 22.07 acres; however, the total useable area is approximately 18.9 acres based on an assessment of the setback restrictions associated with the zoning designation. The buildable portion of the site was further limited through a Plat Amendment (Instrument Number 110507399) that was recorded by the Broward County Records Division in January 2012, clarifying that the Alpha 250 parcel is limited to 342,000 square feet (sf), or approximately 7.85 acres of industrial use.

The Plat Amendment also noted that additional industrial density square footage, not to exceed 20% of the permitted industrial density square footage, could be allocated to the North Alpha 250 site, dependent on the actual industrial density square footage of other adjacent parcels subject to the Plat Amendment. Based on correspondence with the City of Pompano Beach Planning and Zoning staff, the availability of additional industrial density square footage can only be determined through a formal Zonal Letter request. Therefore, the evaluation of the North Alpha 250 site is based on the currently known 342,000 sf of industrial density. For illustrative purposes, **Figure 13** provides an example facility footprint, in accordance with the 342,000 sf requirement.

Figure 13. North Alpha 250 Setback and Buildable Area

Table 6 summarizes the facility type, capacity, and corresponding minimum acreage requirements defined in the Task 4 Future Needs Assessment White Paper and compares available acreage for development, City of Pompano Beach allowed waste-related uses, as well as the minimum setback to residential zoning. This comparison found that an AD Facility could be constructed at the North Alpha 250 site based on the facility capacity noted, minimum acreage requirements, and zoning concurrence. However, if the capacity of the proposed facility types were reduced, North Alpha 250 could also accommodate a Mulch Facility, Dry MRF or Transfer Station.

The City of Pompano Beach Consolidated Use Table does not include a description of RMPF or Public Drop Off Recycling Centers in its listing of Waste Related Uses. If the Authority would like the City of Pompano Beach to consider development of these types of waste processing facilities, discussions with their ZBA should be held. Note that the Organics Processing Campuses (combination of Mulch, CASP, and Biochar Facilities) were excluded from the listing of waste related uses to be discussed with their ZBA due to the 0.5-mile residential zoning setback required for the Biochar Facility. The North Alpha 250 site is 0.25 miles from residential zoning, therefore a Biochar Facility cannot be constructed at this site.

Table 6. North Alpha 250 Suitable Facilities

Facility Type	Capacity	Minimum Acreage Required Based on Capacity	Available Acreage of Alpha 250 North	City of Pompano Beach Zoning Compliant	Minimum Setback to Residential Zoning	North Alpha 250 Ability to Accommodate Proposed Facilities
SS RMPF	250,000	20	7.85	No	0.25 miles	No[1, 2]
Mulch Facility	175,000	10	7.85	Yes	0.25 miles	No[1]
CASP	73,000	10	7.85	Yes	1-mile	No
Biochar (YW)	30,000	2	7.85	No	0.5 miles	No
Aerobic Digester (AD)	160,000	7	7.85	Yes	0.25 miles	Yes
C&D RMPF	450,000	15	7.85	Yes	0.50 miles	No
Organics Processing Campus – Scenario A (Much and Biochar Facilities)	380,000	18	7.85	No	0.5 miles	No
Organics Processing Campus – Scenario B (Mulch, CASP and Biochar Facilities)	470,000	26	7.85	No	1-mile	No
Organics Processing Campus – Scenario C (CASP and Biochar Facilities)	930,000	82	7.85	No	1-mile	No
Organics Processing Campus – Scenario D (Mulch and Biochar Facilities)	860,000	28	7.85	No	0.5 miles	No
Organics Processing Campus – Scenario E (CASP and Biochar Facilities)	930,000	82	7.85	No	1-mile	No
Dry MRF	160,000	15	7.85	Yes	0.25 miles	No[1]
MWP (Fiber Extraction, AD, & MRF)	330,000	30	7.85	Yes	0.5 miles	No
Public Drop-Off Recycling Center	12,000	0.5	7.85	No	Not Applicable	No[2]
Transfer Station	1,240,000	15	7.85	Yes	0.25 miles	No[1]
WTE	1,000,000	30	7.85	Yes	0.5 miles	No
Landfill	3,400,000	640	7.85	No	1-mile	No

1. Reduced capacity facility could be accommodated.
2. Discussions required with City of Pompano Beach Planning and Zoning to confirm if a special exception or an amendment to Appendix A: Consolidated Use Table of their Zoning Code to include the definition associated with a RMPF and Public Drop Off Recycling Center in their list of allowed waste-related uses.

4.0 INFRASTRUCTURE

The majority of the existing solid waste infrastructure within Broward County is owned and operated by private entities. Following is a description of the existing public, municipal, and privately-owned solid waste infrastructure in Broward County.

4.1 EXISTING PUBLIC AND MUNICIPAL INFRASTRUCTURE

Currently, the only existing public and municipally owned and operated solid waste infrastructure within Broward County are the Broward County Landfill, three County-owned Recycling Drop-Off Centers, and three municipally-owned Recycling and Horticultural Drop-Off Centers. Broward County also owns the South Broward Residue Landfill (Ash Monofill); however, this solid waste facility is operated by a private entity, WIN Waste. These facilities are noted on **Figure 14** below.

The Broward County Landfill is a permitted Class I landfill consisting of 52 lined acres. This site is approximately 588 acres in size and has 263 acres designated to be within the waste site boundary. The Ash Monofill is a permitted Class I landfill consisting of 60.3 acres of permitted waste disposal footprint that are divided into four waste disposal cells.

Additionally, Broward County maintains three Recycling Drop-Off Centers in the northern, central, and southern portions of the County, where residents of several municipalities that executed an ILA with Broward County, can dispose of Household Hazards Waste (HHW), electronic waste (E-waste), and waste tires. Separately, the City of Deerfield Beach, the City of Coral Springs, and the City of Plantation have municipally-owned Drop-Off Centers that can accept a variety of waste streams such as HHW, E-waste, recyclables, tires, food, and yard waste.

Figure 14. Public and Municipally-Owned Solid Waste Infrastructure

4.2 MAINTAINING EXISTING PUBLIC AND MUNICIPAL INFRASTRUCTURE

Broward County's Landfill is permitted to accept Class I solid waste; however, in order to conserve landfill airspace, it is operated as a Class III landfill and only accepts bulk waste, C&D waste, and yard waste. The Ash Monofill only accepts ash residue resulting from the combustion of MSW at the South Broward RRF. Metals are captured from the ash residue, which reduces the volume of ash residue disposed, which conserves airspace at the Ash Monofill. For the Drop-Off Centers, routine

maintenance and replacement of equipment is conducted by the public and municipal government entities, as needed.

4.3 EXPANDING EXISTING PUBLIC AND MUNICIPAL INFRASTRUCTURE OPERATIONS

Broward County has already considered the expansion of its existing public infrastructure. In May 2024, the Annual Statement Letter developed by Keith Engineering stated that the Broward County Landfill had approximately four years of permitted airspace remaining. In order to continue to provide for the Class III waste disposal needs, Broward County commenced a procurement process for the design of a 20-acre expansion of the landfill. Additionally, Broward County has identified funding to plan and design a new building at the North Residential Drop-Off Center, as well as upgrades to the South Residential Drop-Off Center.

4.4 EXISTING PRIVATE INFRASTRUCTURE

The majority of the existing solid waste infrastructure within Broward County is owned and operated by private entities as noted in **Table 7** below. The locations of these privately owned and operated facilities are shown on **Figure 15**.

Table 7. Privately Owned and Operated Solid Waste Facilities in Broward County

Facility Type	Facility Name	Owner/Operator	Location	Materials Accepted
Landfill	Monarch Hill Landfill	WM	2700 Wiles Rd, Pompano Beach, FL 33073	MSW; C&D; White Goods
WTE	Broward County South RRF	WIN Waste Innovations	4400 South State Road 7, Fort Lauderdale, FL 33314	MSW; Yard trash; C&D
SS RMPF	Reuter Recycling of Florida (aka WM Pembroke Pines Single Stream)	WM	20701 Pembroke Road Pembroke Pines, FL 33029	Class I; Class III; C&D; Yard trash; Recyclables
SS RMPF	Pembroke Park R&T	Waste Connections of Florida	1899 SW 31st Ave, Pembroke Park, FL 33009	Class I; Recyclables
C&D RMPF	WM Recycling Oakes Road (Sun 14)	WM	3250 SW 50th Ave, Davie, FL 33314	C&D; Class III; Yard trash;
C&D RMPF	All County Waste Recycling	All County Waste Recycling Inc	1810 SW 42nd Way, Deerfield Beach, FL 33442	C&D; Yard trash; White Goods; Recovered materials
C&D RMPF and RMPF	WCF Deerfield Beach R&T	Waste Connections of Florida	1751 SW 43rd Terrace, Deerfield Beach, FL 33442	Class I; Class III; C&D; Yard trash; Clean debris; Recovered materials

Facility Type	Facility Name	Owner/Operator	Location	Materials Accepted
C&D RMPF and RMPF	WM Recycling Deerfield	WM	1750 SW 43rd Terrace, Deerfield Beach, FL 33442	Class I; Class III; C&D
C&D RMPF and RMPF	Coastal Nineteen MRF	Coastal Waste & Recycling of Florida	7061 SW 22nd Ct, Davie, FL 33317	C&D; Yard Trash; Class III; Clean debris; Recovered materials
C&D RMPF and RMPF	Panzarella MRF	Panzarella MRF LLC	1601 SW 3rd St, Pompano Beach, FL 33069	C&D; Yard Trash; Class III; Clean debris; Recovered materials
C&D RMPF and RMPF	Coastal Waste & Recycling #4	Coastal Waste & Recycling of Florida	1840 NW 33rd St, Pompano Beach, FL 33064	C&D; Yard Trash; Class III; Clean debris; Recovered materials
C&D RMPF and RMPF	Envirocycle	Envirocycle, Inc.	849 SW 21st Terrace, Fort Lauderdale, FL 33312	C&D; Recovered materials
C&D RMPF and RMPF	WM Recycling Pompano (Sun 2)	WM	2281 NW 16th St, Pompano Beach, FL 33069	C&D; Yard Trash; Class III; Clean debris; Recovered materials
C&D RMPF and RMPF	WM Recycling Dania Beach (Sun 3)	WM	3251 SW 26th Terrace, Fort Lauderdale, FL 33312	C&D; Yard trash; Clean debris
Transfer Station	WM Davie Transfer Station	WM	2380 College Ave, Davie, FL 33317	Class I; Recovered materials

Figure 15. Locations of Existing Private Solid Waste Infrastructure

4.5 MAINTAINING AND EXPANDING EXISTING PRIVATE INFRASTRUCTURE

The Authority does not have the ability to require the maintenance or expansion of existing private infrastructure. However, the Authority can leverage the processing and disposal of current and future solid waste quantities by:

- Executing long-term capacity contracts with existing private entities with incentives and disincentives such as elevated processing fees or liquidated damages.
- Consider tax and processing requirement mechanisms on disposal to drive demand to dispose of waste materials towards existing and new market entry recycling options, noting the impacts landfill and WTE disposal has long term.
- Require processing of all waste collected or generated by municipal/public projects be processed and recycled in procurement contracts.
- Adopt policies that would encourage the use of existing private infrastructure to increase waste diversion from public and municipally-owned disposal sites, such as mandatory commercial recycling or C&D recycling ordinances, i.e. permit requirements, disposal requirements, etc.

5.0 COLLABORATION AND REGIONAL PARTNERSHIPS WITH NEIGHBORING COUNTIES

Developing regional partnerships and collaborating with neighboring counties in order to address solid waste management on a regional basis has several benefits, including development of regional specialized processing facilities, ability to leverage economies of scale, and reduced operational costs, and also helping to unify public messaging on recycling and waste handling guidelines which reduces confusion and increases participation in waste diversion programs. Due to the limited availability of land for the development of public or municipally-owned solid waste infrastructure in Broward County, collaboration with neighboring counties to create regional partnerships for the management of solid waste would be beneficial.

The Authority could support the development of large regional solid waste facilities outside of Broward County, funded by ILA member user fees and commit large quantities of the various solid waste streams to these facilities in concert with neighboring counties in order to achieve economies of scale. The locations for these regional solid waste facilities can also be spread amongst the regional partner locales and bulk transportation agreements with haulers can result in lower rates for waste transport to these facilities. Note that rail hauling is typically demand based pricing, not cost based pricing, therefore, economies of scale may not impact pricing significantly.

Additionally, developing a regional partnership allows members to pool financial resources and reduce the individual risk for development of large specialized regional solid waste facilities. Pooling financial resources can justify the investment in diverse waste processing facilities, such as state-of-the-art RMPFs, C&D RMPFs, and organic processing facilities in order to divert portions of the waste stream from being landfilled or sent to WTE.

The nearest counties to Broward County are Miami-Dade and Palm Beach Counties, which are also densely populated. These potential regional partners likely also have limited available land for the

development of regionally sized solid waste facilities. However, less populated counties, such as Collier, Hendry, Glades, Okeechobee, Martin County, St. Lucie County, etc. may be amenable to collaborating with the Authority to create a regional partnership.

6.0 WASTE STREAM DIVERSION

A confluence of programs, policies, contracts, and infrastructure will be required in order for the Authority to increase its waste diversion and recycling rate. This section focuses on recommendations for managing existing and future waste streams for further landfill and WTE reduction.

6.1 EXISTING WASTE STREAMS

6.1.1 MSW

Residential MSW is collected throughout Broward County through curbside collection. Portions of the MSW waste stream, such as yard waste, food waste, recyclables, etc., are typically comingled with curbside MSW collection. MSW is collected and hauled to various transfer stations, in-County and out-of-County landfills, or the South Broward RRF. There are several opportunities to divert portions of the existing waste stream currently being collected through the existing curbside MSW collection.

6.1.2 Recycling

Currently, 20% of Broward County customers do not have access to residential recycling, and five municipalities (Coconut Creek, Deerfield Beach, Margate, Davie, and Pembroke Pines) have suspended or terminated their recycling programs, citing economic considerations such as budget constraints, high processing fees and/or contamination. Restoring curbside residential recycling for 20% of the County, representing approximately 70,000 households, would increase diversion from landfills and the South Broward RRF. By consolidating recycling volumes into the Authority, it will reduce collection and processing costs while also lowering contamination through waste stream and educational homogenization.

6.1.3 Yard Waste

Currently, the County does not directly or conventionally recycle residential yard waste within its jurisdiction. However, some yard waste delivered to private transfer stations is diverted for use at third-party landfills as daily cover. Curbside yard waste collection services, with materials directed to existing private Organics Processing Facilities, would divert this waste stream from landfills and the South Broward RRF.

In order to achieve optimal diversion from processing yard waste, strategies and policies would become necessary to ensure an adequate and diverse end-user market as the type and volume of beneficial organic products are produced and increase over time. To achieve this, policies could be implemented to require municipal governments to use recycled wood products for landscaping and construction of municipal projects, along with implementing purchasing policies, permitting exceptions, and other incentives that would increase the local demand and consumption.

6.1.4 C&D Waste

Currently a majority of the mixed C&D waste generated in Broward County is landfilled. The most recently published Annual Solid Waste Management Report from the Florida Department of

Environmental Protection shows Broward County having only a 39% recycling rate for C&D in 2023. Although there is a robust network of privately owned and operated C&D recycling facilities within the County, the Authority could implement policies to increase waste diversion from disposal for this waste stream.

The Construction and Demolition Debris Management Options White Paper identified common ways solid waste jurisdictions can encourage and incentivize increased recycling and waste diversion of C&D materials through policy implementation. Municipalities often use deposit programs, green building policies, deconstruction mandates, permit requirements for construction and disposal bans as policy tools.

6.2 RECOMMENDATIONS TO HARVEST FUTURE WASTE STREAMS

Traditional curbside waste collection addresses MSW and recyclables. However, there are opportunities to further segregate, collect, and divert the waste stream, as discussed in the subsections below.

6.2.1 Food Waste

Food waste represents a substantial portion of the waste stream and a large diversion potential from landfills and the South Broward RRF. Under current Florida law, facilities receiving food waste would need to be designed, permitted, and operated as solid waste facilities. Curbside food waste collection services, with materials directed to future Organics Processing Facilities, such as CASP or AD facilities, would divert significant volumes of this waste stream from landfills and the South Broward RRF, and convert a waste product into a beneficial soil product. It should be noted that post-consumer food waste is regulated under both Chapter 62-709 and Chapter 62-701 FAC, which limits the end-use of composted material based on the components of the waste stream utilized to generate the compostable material and identifying and securing receiving facilities for beneficial end uses of the products generated from food waste processing will be critical.

To encourage increased awareness about the impacts of household waste generation and to foster personal responsibility for managing waste more sustainably, many communities have started initiatives to promote the use of backyard composting as a means of reducing food waste entering the solid waste system. Several local governments have implemented initiatives to help promote residential backyard composting via implementing compost bin giveaways and establishing composting training programs. Local Florida examples include Hillsborough County and the City of Tampa who have developed a collaborative partnership with the University of Florida Cooperative Extension Office to provide backyard composting bins to residents who register and successfully complete an online training course that provides guidance on backyard composting and also covers related topics like single stream recycling guidelines. Training sessions are provided throughout the year whereby residents can register to participate.

6.2.2 Commingled Food and Yard Waste

In order to reduce the number of curbside residential collection services, the food and yard waste streams could be comingled and sent to future Organics Processing Facilities, such as CASP or AD facilities; this would divert this waste stream from landfills and the South Broward RRF, converting a waste product into a beneficial soil product. It should be noted that post-consumer food waste is regulated under both Chapter 62-709 and Chapter 62-701 FAC, which limits the end-use of composted material based on the components of the waste stream utilized to generate the

compostable material and identifying and securing receiving facilities for beneficial end uses of the products generated from food waste processing will be critical.

6.2.3 Land Clearing

Land clearing debris is generated through the process of removing trees, shrubs, and other vegetation from a piece of land as part of the development process. In order to divert this waste stream from landfills, policies requiring the delivery of land clearing debris from private and public or municipal government construction projects within the County could be implemented, requiring the delivery of this waste stream to future Organics Processing Facilities such as Mulch, Biochar, and Colorized product processing Facilities.

6.2.4 Electronic Waste

Electronic waste products are currently collected via the existing Broward County Residential Drop-Off Centers, as well as the City of Deerfield Beach and City of Coral Springs Residential Drop-Off Centers. Several municipalities executed an ILA with Broward County to allow their residents to drop off electronic waste, free-of-charge. This service is available to all other residents in Broward County for a fee. Allowing all ILA member residents the ability to drop off electronic waste at these existing Residential Drop-Off Centers without paying a fee at the time of drop-off (user fees would be paid annually by all ILA member residents) may help divert some of the electronic waste stream. Additionally, development of eight additional future Residential Drop-Off Centers, as recommended and further described in all five Scenarios developed as part of the Task 4 White Paper, at strategic locations throughout the County would also allow for increased access to electronic waste recycling and increased diversion from landfills and the South Broward RRF.

6.2.5 Disaster Debris

Disaster events, such as hurricanes, typically generate large volumes of waste that can overwhelm municipal solid waste systems. Debris composition typically involves two distinct waste streams consisting of vegetative waste (i.e. fallen trees and branches) and C&D materials (i.e. damaged buildings due to high wind and flooding). While these waste streams are not generated on consistent intervals, it does impact waste disposal facilities servicing the County when disaster events occur. There are currently 43 Pre-Authorized Disaster Debris management sites throughout the County, which are temporary operating yards that are used to hold and manage disaster debris until it can be taken to recovery facilities or final disposal. The number and location of Pre-Authorized Debris management sites fluctuate throughout the year as part of the annual renewal process, however, Broward County maintains a GIS map, which represents the most up-to-date information, showing the number and location of Pre-Authorized Debris management sites in Broward County, which can be accessed via the following link:
https://bcgis.maps.arcgis.com/apps/dashboards/7af5e709247949cc9c5698487ec74fe6

In order to divert a portion of this waste stream, these management sites could be equipped with similar machinery used at C&D RMPFs and mulching facilities. Vegetative waste is typically processed on site via grinding to reduce the overall volume of material. The disaster debris materials could also be delivered to existing C&D RMPFs in order to recover and divert as much recyclable materials as possible prior to landfilling, however its best practice to have proactive discussions with existing C&D facilities to determine their capacity and willingness to accept disaster related debris in the event of a future disaster.

6.2.6 Shore and Marine Waste Flows

Shore and marine waste flows represent another class of waste not generated on consistent intervals, which impacts public and municipally-owned waste disposal facilities. Examples of shore waste flows include sargassum inundation events and mass fish kills, where sargassum seaweed and/or dead fish and other marine organisms are washed onto beaches or other shorelines after storms, tides and algal blooms. This waste stream currently must be collected for disposal at either a landfill or the South Broward RRF.

Shore and marine waste could be directed to future Organics Processing Facilities such as CASP or AD and converted into a beneficial soil product. The University of Florida Hinkley Center and other researchers have conducted research on this subject, however, the results needed for implementation of long-term use for organics processing are not yet conclusive. Marine materials have odor, high salinity, moisture, and chemical properties that make loading rates for use into Organic Processing Facilities limited. It is also important to ensure the shore and marine waste flow feedstock works, either commingled with other waste streams or as a separate batch entry. When the Organic Processing Facilities are constructed, batch testing, either commingled or source separated, should be conducted, in order to determine appropriate loading ratios, shredding requirements, de-salting, drying, odor management, etc.

6.2.7 Scrap Tires

Florida's generation of used passenger tires is just over one used tire per person per year, or around 2 million (37,000 TPY) scrap tires generated per year in Broward County. Due to the state's regulated scrap tire recycling and disposal programs, the recycling rate for scrap tires captured through the well-established retail take back program in the state is estimated at 90%.). However, tires managed through Broward County's existing solid waste system have poor recovery. Most of these tires are identified, collected, and processed at disposal sites (landfills/transfer stations) through loader operator site identification and stockpiling, litter abatement management programs, and drop off center programs. The rest are not identified and are disposed in landfills. In the latest 2023 Florida Department of Environmental Protection (FDEP) Solid Waste Management Report, Broward County reported 24,483 tons of tires managed in their solid waste system with only 3% of those tires being recycled.

The two major scrap tire processing facilities in southern Florida are located 100 miles away in Port St. Lucie, Liberty Tire and The Florida Tire Recycling Plant. **Table 8** summarizes the end uses for tires and their respective ranges of recovery, depending upon current market demands.

Table 8. Tire End Use and Recovery Range

Scrap Tire End Use	Ranges of Recovery
Graded Tires for Re-Use Domestically and Export	5-15%
Tire Derived Fuel (Whole Tire)	2-4%
Tire Derived Fuel (Shredded) for Cement kilns and specialty boilers (mills)	20-40%
Metal Recovery	8-12%
Used tire Alternative Daily Landfill Cover	10-20%
Crumb rubber and tire derived aggregate (TDA) manufacture	5-8%
Nylon/Polyester Removal and Fluff bulk recycling	6-8%
Residue for Disposal	5-10

Market development towards a local scrap tire processing and recovery solution, which includes a focus on the tires found in the solid waste system, may result in reduced shipping costs, and partnerships with neighboring counties for the processing and recovery of their waste tire streams, especially Miami-Dade County, could also be undertaken, further reducing costs through freight savings and optimization. It is recommended that the Authority consider modifying the existing operations of its ILA members to identify, segregate, and stockpile scrap tires at solid waste sites in accordance with FDEP regulations and pursue a procurement to identify a private contractor that would collect scrap tires from existing solid waste sites on a regular basis and haul them to a recycling facility. Given Broward County's proximity to existing tire processing facilities, this approach should yield competitive bids and a viable contractor to provide enhanced recycling of scrap tires removed from the waste system. Hillsborough County, FL has recently taken a similar approach to managing tires in order to better divert scrap tires from disposal and issued a new contract in 2024 that may serve as a useful reference.

6.2.8 Battery Recycling

Three types of batteries are most often found in the waste stream.

- The first is lead acid batteries, commonly used in cars, boats, and golf carts, which are recycled at rates above 90%, and though taken at public drop off centers are generally well managed through auto scrap yards and battery installation take back programs. The positive value and regulatory programs with this battery set are very effective. There is a state landfill ban on these types of batteries.

- The second is single use non-lithium primary or disposable batteries, which are mostly post-consumer alkaline batteries. These are considered safe for disposal in Florida landfills and recycling rates are very low. They are collected through various channels including Call2Recycle retail drop off locations (https://www.call2recycle.org/locator/), e-waste processors, and public drop off programs, but the supply chain is very weak.

- The third class are both primary single use lithium batteries and rechargeable secondary batteries, which are mostly based on lithium- ion technology, though nickel cadmium and other types are still in the waste stream. Though more precise volume numbers are almost universally pay-walled, each North American citizen in 2023 consumed approximately 4.75 non-vehicle LI batteries annually, up from approximately three batteries just two years prior, and 66% more per year than before the COVID-19 pandemic.

Battery recycling, especially for the third stream, is still in development. Lithium batteries as a class are very powerful and that power is increasing, both in energy density and storage capability. Additionally, battery portability (or package streamlining) has improved immensely, meaning that the coverings of the batteries themselves are becoming lighter. A third trend is the growing use of these batteries being embedded in consumer products, creating additional risks of fire to solid waste collection, processing, and disposal facilities.

Recycling for lithium batteries has not developed mostly due to the handling costs and risks surrounding the batteries themselves. For instance, the ease at which end of life lithium battery cathode/anode separators get damaged, which causes electrothermal short circuit reactions, and raises temperatures anywhere from 315 to 700C, depending upon chemistry, causes a very high risk of fires any time these batteries move through the disposal or recycling supply chains.

Another issue mechanical plants faced is the still predominate customization of batteries, including countless chemical compositions besides lithium (over 40,000 different chemistries have been used in LI batteries). In addition, batteries come in numerous sizes and shapes, requiring separate handling techniques for each (from CCM pacemakers to cubic meter electric truck battery packs). Finally, there was and still is a continuing and swift evolution of physical components, like casings, embedding batteries in products, etc. The combined heterogeneity in feedstock made manual and mechanical recycling (sorting and separating) difficult. Finally, there have been continuing major fires at lithium battery recycling facilities which also has gone unabated.

There are now approximately 12 fully operational, running-as-intended lithium battery facilities in Canada and the U.S. This fleet does not yet accept, nor can local recycling centers afford sending feedstock from many large markets. In these municipal cases, battery recycling is not occurring. But there has been steady demand growth for feedstock, and good progress in process and technology.

- Technology- The new facilities are using decommissioning techniques to stabilize batteries during storage before processing. The facilities are designed to pre-process batteries into a new, uniform feedstock called "black mass", which is the output material from controlled classifying and shredding different types of lithium batteries. From there, metals are extracted utilizing advanced heat and chemical processes, which together are producing lower thermal runaway occurrences, and much better recovery rates for the precious metals in that scrap. This is needed to increase margins.

- Funding- As the industry sorted itself out from the undercapitalized mechanical sorters, lithium battery recycling companies emerged with federal funding, capital backers, and advanced technologies. Demand for the strategic metals in lithium batteries (lithium, manganese, cobalt and nickel) is expected to rise quickly on the world market. One factor is that China is now producing well over 70% of all lithium battery components, and over 70% of lithium itself worldwide. And, due to politics, trade routes may become tenuous. This has led to new investment and enthusiasm in the battery recycling market. Per market research, some facilities are now emerging in continuous operations, which are meeting expectations. In addition, the new generation of facilities are electric-vehicle-focused for scale, primarily because of the very low recovery of post-consumer residential LI batteries, compared to a steady supply which is increasing from auto dismantlers, electric bike scrap and ICI energy storage platforms. However, some are combination of both EV, ICI, and post-consumer feedstock. and ICI sources.

Broward County's recent adoption of the new battery recycling ordinance in April of 2025, is a best management practice that will help increase battery recovery and reduce the threat of fires posed to solid waste collection, processing, and disposal systems. The ordinance provides for a pragmatic approach to mandating battery collection at certain retail locations that sell batteries as a means of increasing public awareness and access to a convenient battery recycling and disposal program. The ordinance also requires affected retail locations to pay for proper battery recycling and disposal, thereby helping to ensure shared responsibility for end-of-life battery management by private companies in addition to the County and its municipalities.

6.2.9 Land Application Treatment of Clean Yard Waste and Vegetative Storm Debris

Structural economic and data gaps have limited the potential end use of yard waste and clean vegetative storm debris for land reclamation treatment in the state by active tilling at proper rates. With abundant farmland adjacent to Broward County to the west, it may be advantageous in the long term to consider yard waste flows as a potential land treatment to a market where soils need such treatment. Another possible option is to implement policies prioritizing the use of mulch at public facilities throughout Broward County, as well as public projects, to generate annual local demand for locally-developed mulch materials.

Though it is often touted as a residential "green" method for households https://livetoplant.com/how-to-enhance-soil-quality-using-shredded-yard-waste/, the use of this material on large plot, depleted soils which are nutrient poor, karst, or sandy, has not been well studied.

The use of bulk vegetative waste for land tilling/mulching for soil reclamation treatment must consider scientifically derived "slow" application loading rates that protect waterways from PH, nutrient and chemical overload through setbacks and other management practices. In addition, site and soil considerations should be addressed prior to its implementation, including topography, current vegetative cover, subsurface hydro-geology features, precipitation, wind velocity, soil type and texture, water-holding capacity, and nutrient content. However, the amount that could be used beneficially even at very low load rates would consume a good portion of the waste and provide a long-term alternative diversion market which does not require composting. This would limit the amount of imported materials which might otherwise be needed to reclaim such soils. This practice has also historically been used without scientific consideration in large storm responses because of its more reasonable cost. Because of the size of this potential regional market and the need for land reclamation of Florida's agricultural footprint, it is recommended that continued study on this option be undertaken to support greater diversion during the planning horizon.

7.0 SCENARIO COST COMPARED TO GOALS ACHIEVED

Five solid waste management scenarios were developed as part of the Task 4 Future Needs Assessment White Paper to develop options for meeting the future solid waste and recovered materials processing capacity necessary to achieve the Authority's 75% waste diversion goal by 2045. The Task 4 White Paper concluded that Scenario C is most likely to achieve the Authority's waste diversion goals. However, that analysis was the first step in facilitating further collaboration and discussions with the stakeholder community. The following subsections rank the scenarios developed in the Task 4 White Paper based on their cost impacts on goals such as recycling, reuse, diversion from landfills, zero-waste strategies, market risks, environmental impacts, safety, efficient processing of solid waste, and increased recycling.

7.1 SCENARIO COST RANKING

Scenario screening criteria were developed in order to evaluate and rank each of the five solid waste management scenarios, which are presented in **Table 9**. The costs of each factor identified below were ranked for each scenario:

- **Diversion:** Cost associated with the amount of MSW diverted from landfills and WTE.

- **Zero Waste Strategies:** Cost associated with the development and implementation of zero waste strategies for each scenario. Note that all scenarios included the implementation of similar zero waste strategies to achieve waste diversion from landfills and WTE with the exception of Scenario D, which employs a wet/dry MSW collection system, which would make policies that require the source separation of food waste from wet MSW and recyclables from dry MSW unnecessary. Examples of zero waste strategies include:
  - Setting waste diversion goals
  - Implementing policies such as:
    - Supporting Extended Producer Responsibility (EPR)
    - No burn/no bury policies for specific material types
    - Harmonizing the lists of targeted curbside recyclables
    - Mandatory universal recycling and food waste ordinances
    - Mandatory food waste donation by businesses that generate higher volumes, such as grocery stores and restaurants
    - Purchasing policies favoring or requiring local recycling or use of recycled materials, or processing of wastes generated by County projects by ILA member governments.
    - Exclusive and non-exclusive Franchise Requirements for diversion in contracts.
    - Reporting requirements for haulers specifying tonnages by waste stream type (MSW, organic waste, recyclables, etc.) destination of these waste streams, and mass balance diversion.
    - Single Use Item Disposal Bans
    - C&D recycling ordinances

- **Market Risks:** Costs associated with potential market risks, such as increased operational costs and/or reduced profitability due to fluctuations or changes in the composition of the solid waste stream and associated demand for the solid waste management services identified in each scenario.

- **Environmental Impacts and Health and Safety:** Costs associated with the various levels of risk, associated with the different types of facilities and technologies proposed for each scenario, including potential impacts to air, surface water, groundwater, and soil quality.

- **Cost Efficiency of Processing Solid Waste:** Cost associated with the efficient processing of solid waste in a comprehensive system that prioritizes waste prevention, reduction, reuse, and recycling, while ensuring safe and environmentally sound disposal of unavoidable waste.

- **Increased Recycling:** Costs associated with achieving increased recycling rate through the implementation of each scenario.

Table 9. Scenarios and Goals: Cost and Other Impacts

Scenario	Recycling (Cost)	Reuse (Cost)	Diversion (Cost)	Zero Waste Strategies (Cost)	Market Risks (Cost)	Environmental Impacts, Health and Safety (Cost)	Cost Efficiency
A	Low	Low	Medium	Low	Low	Medium	High
B	High	High	High	Medium	High	High	Medium
C	High	High	High	Medium	High	High	Medium
D	Medium	Medium	Medium	High	Medium	High	Low
E	High	High	High	Medium	High	High	Low

Based on the above rankings, the scenario with the highest cost impact compared to goals is Scenario E, and the scenario with the lowest cost impact compared to goals is Scenario A.

8.0 WIN WASTE SOUTH BROWARD RRF

The South Broward RRF is located at 4400 South State Road 7, Fort Lauderdale, FL 33314. The facility is privately owned and operated by WIN Waste Innovations. The facility is a mass burn WTE facility that was constructed in 1991 and consists of three Municipal Waste Combustor (MWC) units with auxiliary burners, lime storage and processing facilities, ash storage and processing facilities, an air-cooled condenser (ACC), and ancillary support equipment. To address future waste processing needs, space was included during the initial construction of the South Broward RRF for the development of a fourth MWC unit; a fourth flue was also included in the stack, as well as acreage to the south of the facility to accommodate future buildout.

The facility currently operates 24 hours a day, 365 days a year, except for maintenance outages. It only accepts processible residential, commercial, and nonhazardous waste. The facility's MWC's each have a nominal design capacity of 750 tons per day (TPD), and the total throughput capacity is limited to a maximum of 2,589 TPD. The nominal (i.e., generator nameplate) electric generating capacity of the facility is 66.1 megawatts (MW), which is the gross electricity that includes in-house electrical usage and electricity sold to the local utility company. The South Broward RRF receives and processes a large portion of the Authority's waste stream. The resulting ash residue from the facility is disposed in an onsite Class I ash monofill owned by Broward County.

8.1 EXISTING FACILITY EXPANSION

Each of the five planning scenarios includes the use of existing waste processing capacity at the South Broward RRF. Based on the results of the Waste Generation Model developed as part of the Task 2 White Paper, additional processing capacity would provide for volume reduction of waste that was not otherwise beneficially used over the planning period. Therefore, this section investigates the cost to expand the South Broward RRF to include a fourth MWC, increasing capacity from the nominal design capacity of 2,250 TPD to 3,000 TPD.

8.2 DISADVANTAGES OF EXISTING FACILITY EXPANSION

The South Broward RRF has been operating since 1991, and, while it is well-maintained by WIN Waste, it has not undergone extensive refurbishment during this timeframe. Due to the complexities of adding a fourth MWC unit, as well as the age and condition of South Broward RRF, there are both technical and financial disadvantages, which include:

- The current equipment systems common to all of the MWCs (i.e., the turbine/generator, demineralized water, deaerator, Air Cooled Condenser (ACC), Continuous Emissions Monitoring System (CEMS), refuse pit and cranes, ash handling conveyors and storage, and many other systems), currently are not sized sufficiently to construct a new MWC without also modifying and adding to these systems.

- While the boiler and Air Pollution Control (APC) systems would be a relatively static cost on a per-ton-basis, the common systems, whether newly built specifically for the new MWC or modifications to the existing systems, would cost more on an economy-of-scale, per-ton-basis when compared to building a new greenfield facility.

- The South Broward RRF site has some physical limitations to expansion, including:

    - The refuse pit and tipping floor do not have much space on either side, north or south, to extend without impacting other building areas.

    - While a physical space was left on the south side of the facility for a future fourth MWC unit and APC during initial construction, ash handling and storage equipment were constructed in this space after commercial operation that would now need to be relocated to accommodate a fourth MWC unit.

    - While there is sufficient acreage onsite, other common equipment for the MWCs currently does not have sufficient space to accommodate a future expansion and would need to be evaluated for suitable locations.

- A fourth flue was placed in the stack to accommodate a future fourth boiler, but a structural evaluation would be required to determine its current condition prior to any future use.

- The existing electrical distribution system is not sized sufficiently to increase capacity; however, there is room in the switchyard to accommodate additional transformers and equipment.

- The existing ash monofill onsite has approximately 15 years of remaining airspace and there does not appear to be space available for expansion. Any additional capacity added to the South Broward RRF would decrease the remaining airspace of the monofill faster and would require ash hauling and disposal at another landfill.

8.2.1 Advantages of Existing Facility Expansion

There are several potential advantages to expanding the South Broward RRF site, including:

- The existing site has the utilities required for an expansion compared to developing a new greenfield site, including electrical distribution lines and grid tie-in ability.

- The existing site is currently a permitted Power Plant Siting Act (PPSA) site, and modification of an existing PPSA permit is typically more streamlined and timelier as compared to pursuing a new PPSA permit at a new greenfield site within the County.

- The existing site includes a co-located monofill and may result in less public opposition compared to a new greenfield site within the County.

8.2.2 Lifetime Cost of Existing Facility Expansion

Due to the issues raised in the disadvantages of expansion subsection above, the cost of expansion per ton of MSW disposed likely will be the largest cost per ton when compared to other disposal options. Expansion costs can vary considerably depending on the location, site logistics, and numerous other factors. Three other WTE facility expansions have occurred in Florida in the past 20 years. Escalated to 2025 dollars. **Table 10** summarizes the expansion cost for these facilities.

Table 10. WTE Expansion Cost Summary

Facility	Year of Construction Cost	TPD of WTE Expansion	Approximate Cost (2025 Dollars)	Cost Per Ton Per Day of Expansion
Pasco County	2025	515	$260,000,000	$505,000
Hillsborough County	2009	600	$203,000,000	$394,000
Lee County	2007	636	$179,000,000	$281,000

Even beyond a typical 3% escalation increase to bring the costs to 2025 dollars, it is apparent that expansion costs have risen significantly in recent years due to COVID and many other supply chain and other cost factors. Using Pasco County's expansion as the most recent post-COVID example, expansion costs could exceed $500,000 per ton per day of capacity built. For an estimated 750 TPD expansion of South Broward RRF, this would equate to an estimated $378 million in design and construction costs.

8.3 DEVELOP NEW FACILITY AT EXISTING LOCATION

While an expansion may be feasible on the existing site, the additional 750 TPD (approximately 250,000 to 300,000 TPY) would not be sufficient to offset the necessity of an additional landfill or additional WTE capacity based on the Authority's total volume and predicted diversion rates to other diversion initiatives. If additional capacity is still required, a greenfield WTE facility or landfill capacity sufficient to cover the same volume of disposal would be more cost-effective than expansion on a per-ton-basis.

When compared to an approximate cost of $330,000 per ton per day for a new greenfield WTE facility, it is apparent that a new facility would be significantly more cost-effective when compared to expansion at the South Broward RRF.

8.3.1 Disadvantages of New Facility at Existing Location

South Broward RRF is privately owned and operated. Negotiations with WIN Waste to develop an agreement for the development of a new WTE facility would be required for either the purchase of the existing facility as-is or for the private development of a new WTE Facility.

Additionally, there does not appear to be sufficient space onsite to build a new WTE facility without demolishing the existing South Broward RRF. Should the Broward Authority determine that additional WTE capacity, beyond what can be gained via expansion, is necessary, then a siting study is recommended to assess the viability of utilizing adjacent properties that may include the neighboring private warehouses and development of known wetland habitat.

8.3.2 Advantages of New Facility at Existing Location

There are several potential advantages to building a new WTE facility at the South Broward RRF site:

- The existing site has existing utilities required for a new facility compared to developing a new greenfield site, including electrical distribution infrastructure and grid tie-in ability.
- The existing site is currently a PPSA permitted site, which could be modified to allow for the development of a new WTE facility. Modification of an existing PPSA may be more streamlined as compared to development and approval of a new PPSA at a greenfield site.
- The existing site includes a co-located monofill and may result in less public opposition compared to a new greenfield site elsewhere within the County.

8.3.3 Lifetime Cost of New Facility at Existing Location

Cost factors for a new WTE facility at the existing location would not be substantially different than at most other potential locations. While there may be slight decreases in cost due to existing site utilities and permit-ability, those cost savings may not exceed the lost disposal capacity from the loss of the South Broward RRF during construction. An estimated cost of approximately $330,000 per ton per day is still expected, regardless of the existing location.

9.0 ENVIRONMENTAL BENEFITS OF WTE

WTE facilities provide numerous environmental benefits to their communities. As their primary driver for existence, the facilities are almost wholly focused on reduction of MSW, with a reduction in volume of approximately 90% and a reduction in weight by 75%. When facilities are located appropriately in communities, WTE can provide a shorter hauling distance for solid waste collections vehicles and can supplant required transfer stations. The remaining combustion residue being 75% lighter results in reduced hauling costs and emissions from hauling. WTE facilities also produce less greenhouse gas emissions, and have reduced negative impacts to surface water, groundwater, and odor, as compared to landfills.

Additionally, studies show that WTE facilities increase recycling in their communities. WTE facilities are typically equipped with Advanced Metals Recovery equipment, which extract and recover ferrous and non-ferrous metals from the waste stream for recycling which reduces the mining, hauling, and energy burdens to produce virgin metals for products. These metals are not typically captured in traditional single-stream recycling initiatives and would be landfilled, unnecessarily taking up airspace in landfills. Communities with WTE facilities also tend to have the highest traditional recycling metrics, due to robust programs to reduce all forms of waste from going to the landfill. Many traditional recycling focuses, such as food waste and other organic wastes, glass, etc., provide virtually no value to WTE facilities from an energy generation perspective and are therefore encouraged to be diverted and recycled through other recycling and re-use technologies. Other products, like high-numbered, traditionally non-recyclable, plastics are a great energy source and help prevent those plastics from breaking down into permanent microplastics in our water sources and entering the food chain. WTE facilities in Florida are also leading the charge in developing more robust combustion residue processing technologies to capture extremely small precious metals such as silver, gold, platinum, and others, as well as make clean aggregate and sand which can then be re-used as an amendment in concrete and asphalt. As these technologies are further developed, up

to 80% of combustion residue may end up being beneficially re-used, resulting in reduced landfill airspace usage.

As an added benefit to volume and weight reduction, WTE facilities generate renewable energy. A 1,000,000 TPY WTE facility would generate roughly 80 MW of electricity. This would offset the electricity requirements of roughly 60,000 homes. According to the US Energy Information Administration, in 2024 Florida only produced 10% of its electricity requirements from renewable sources. WTE facilities are an excellent source of renewable energy and produce significantly less greenhouse gases and other pollutants as compared to traditional fossil-fuel facilities and substantially less greenhouse gas emissions than landfills. When including fossil-fuel offsets (reduction in fossil-fuel use due to the energy produced by WTE), reductions in fossil-fuel mining, transportation, and hauling, and reductions in methane production from organic wastes in landfills, WTE facilities are a net-negative impact to greenhouse gas emissions. WTE facilities are also currently testing carbon capture processes to remove carbon emissions from the stack before they are emitted. While expensive, these technologies are showing promise with efficient removal during small-scale tests. As carbon sequestration technologies mature, WTE facilities will be ready to capture and sequester greenhouse gas emissions to further increase their net-negative benefits.

WTE technologies are also showing increasing promise for the permanent destruction of forever chemicals such as per- and polyfluoroalkyl substances (PFAS). PFAS compounds are widely used in many commercial and industrial products and have been concentrating within a variety of ecosystems and food chain structures with unknown long-term impacts to ecology and human health. High temperatures are one of the few ways to destroy PFAS compounds, and modern WTE facilities can be designed to easily surpass this threshold. However, some testing on existing WTE facilities performed in concert with the EPA shows an extremely high level of destruction (up to 97%). While the EPA has not yet published the data relating to these tests, they show a very important potential long-term benefit for WTE as a method of permanently destroying these forever chemicals.

Owner Name	Acreage (Individual Parcels)	Site Identifier	Combined Acreage by Site	Residential Buffer (0.25mi)	Residential Buffer (0.5mi)	Residential Buffer (1mi)	Airport Buffer	Floodplain	Notes
CITY OF PARKLAND	40.89	A	54.9	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PARKLAND	8.49		54.9	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PARKLAND	0.19		54.9	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PARKLAND	5.33		54.9	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	1.24	AA	9.83	In	In	In	In	In	Removed from the Site AA set of parcels as this land is within All Residential Buffers.
BROWARD COUNTY	6.3		9.83	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	0.07		9.83	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	2.22		9.83	Out	In	In	In	In	Selected for Further Evaluation
CITY OF PARKLAND	12	B	12	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	23.88	BB	38.85	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	2.93		38.85	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	3.09		38.85	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	1.25		38.85	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	7.7		38.85	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF COCONUT CREEK	10.03	C	10.03	In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	2.2	CC	14.84	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	12.64		14.84	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF DEERFIELD BEACH	49.82	D	49.82	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	5.43	DD	35.4	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	4.99		35.4	In	In	In	In	In	Removed from the Site DD set of parcels as this parcel is within all Residentials Buffers.
BROWARD COUNTY	2.1		35.4	In	In	In	In	In	Removed from the Site DD set of parcels as this parcel is within all Residentials Buffers.
BROWARD COUNTY	0.1		35.4	In	In	In	In	In	Removed from the Site DD set of parcels as this parcel is within all Residentials Buffers.
BROWARD COUNTY	9.31		35.4	In	In	In	In	In	Removed from the Site DD set of parcels as this parcel is within all Residentials Buffers.
BROWARD COUNTY	2.45		35.4	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	11.02		35.4	In	In	In	In	In	Removed from the Site DD set of parcels as this parcel is within all Residentials Buffers.
BROWARD COUNTY	4.24	E	49.01	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	1.57		49.01	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	21.14		49.01	Out	In	In	In	In	Removed from the Site E set of parcels as this land was developed as part of a Broward County transportation project.
BROWARD COUNTY	22.04		49.01	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	0.02		49.01	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	0.2	EE	42.39	In	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	6.94		42.39	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	35.25		42.39	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	3.21	F	59.59	Out	In	In	In	In	Less than 5-acres, Not Selected for Further Evaluation
BROWARD COUNTY	25.39		59.59	Out	In	In	In	In	North Alphaa 250 Site, Conservation Easement Prevents Development, Not Selected for Further Evaluation
BROWARD COUNTY	30.99		59.59	Out	In	In	In	In	Wastewater Treatment Plant Site, Not Selected for Further Evaluation
BROWARD COUNTY	0.27	FF	58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.27		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	49.36		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.26		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.26		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.26		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.26		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.39		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.3		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	4.56		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	2.37		58.56	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	36.58	G	47.97	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	11.39		47.97	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.19	GG	40.3	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.58		40.3	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	2		40.3	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	37.17		40.3	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.35		40.3	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF POMPANO BEACH	3.84	H	13.13	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF POMPANO BEACH	9.29		13.13	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	46.4		47.93	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation

Owner Name	Acreage (Individual Parcels)	Site Identifier	Combined Acreage by Site	Residential Buffer (0.25mi)	Residential Buffer (0.5mi)	Residential Buffer (1mi)	Airport Buffer	Floodplain	Notes
BROWARD COUNTY	0.94	HH	47.93	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.11		47.93	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.47		47.93	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	6.13	I	6.13	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	50.36	II	50.4	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	0.04		50.4	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF TAMARAC	10	J	27.36	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF TAMARAC	17.36		27.36	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	4.03	JJ	9.73	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	5.7		9.73	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF SUNRISE	26.3	K	26.3	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF COOPER CITY	5.14	KK	5.14	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PLANTATION	2.93	L	6.63	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PLANTATION	0.81		6.63	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PLANTATION	1.48		6.63	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PLANTATION	1.41		6.63	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	5.48	LL	5.48	In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF LAUDERHILL	1.7	M	13.93	In	In	In	In	Out	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF LAUDERHILL	6.36		13.93	In	In	In	In	Out	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF LAUDERHILL	5.87		13.93	In	In	In	In	Out	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	19.41	MM	46.18	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	19.4		46.18	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	2.43		46.18	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	2.5		46.18	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	2.43		46.18	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	39.27	N	60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.13		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.13		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.13		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.13		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.11		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.23		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.11		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.11		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.11		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.11		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	19.35		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.12		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.12		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.12		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.12		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.12		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.12		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.12		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	0.14		60.92	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	574.7	NN	574.7	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	7.29	O	7.29	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	65.57	OO	65.57	Out	In	In	Out	In	Selected for Further Evaluation
CITY OF FORT LAUDERDALE	6.13	P	6.13	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	14.54	PP	24	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	9.46		24	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	37.2	Q	37.2	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	4.95	QQ	11.44	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	6.49		11.44	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	17.37	R	17.37	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	45.3	RR	45.3	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	11.37	S	11.37	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	13.91	SS	30.72	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	9.38		30.72	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	4.91		30.72	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	2.4		30.72	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	0.13		30.72	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation

Owner Name	Acreage (Individual Parcels)	Site Identifier	Combined Acreage by Site	Residential Buffer (0.25mi)	Residential Buffer (0.5mi)	Residential Buffer (1mi)	Airport Buffer	Floodplain	Notes
BROWARD COUNTY	18.53	T	18.53	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	12.5	TT	12.5	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	3.59	U	3.59	Out	In	In	In	In	Selected for Further Evaluation
CITY OF MIRAMAR	21.79	UU	21.79	In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	15.27	V	24.91	Out	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	9.63		24.91	Out	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF MIRAMAR	14.43	VV	14.43	In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	6.13	W	6.13	Out	In	In	In	Out	Selected for Further Evaluation
BROWARD COUNTY	5.34	X	5.34	Out	In	In	In	In	No Existing Roadways Present, Site Size Can Only Accommodate Drop Off Recycling Center, Environmentally Sensitive Lands Present, Not Selected for Further Evaluation
BROWARD COUNTY	44.23	Y	44.23	In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	10.25	Z	19.51	Out	In	In	In	In	Selected for Further Evaluation
BROWARD COUNTY	9.26		19.51	Out	In	In	In	In	Selected for Further Evaluation

Owner Name	Acreage	Site Identifier	Residential Buffer (0.25mi)	Residential Buffer (0.5mi)	Residential Buffer (1mi)	Airport Buffer	Floodplain	Notes
SCHOOL BOARD OF BROWARD COUNTY	16.9893		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
SCHOOL BOARD OF BROWARD COUNTY	8.6691		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
NORTH SPRINGS IMPROVEMENT	15.7785		In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
NORTH SPRINGS IMPROVEMENT	7.73		In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
NORTH SPRINGS IMPROVEMENT	18.6208		In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
SCHOOL BOARD OF BROWARD COUNTY	10.1396		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PARKLAND	8.4941	A	In	In	In	Out	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PARKLAND	40.892	A	In	In	In	Out	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
NORTH SPRINGS IMPROVEMENT	21.2617		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
NORTH SPRINGS IMPROVEMENT	81.7421		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PARKLAND	5.3287	A	In	In	In	Out	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
NORTH SPRINGS IMPROVEMENT	5.7		In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
MARGATE COMMUNITY REDEVELOPMENT	17.0122		In	In	In	In	In	Within All Residential Buffers, Part of Community Redevelopement District, Not Selected for Further Evaluation
SCHOOL BOARD OF BROWARD COUNTY	4.9979		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF COCONUT CREEK	4.8359		In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF COCONUT CREEK	7.5913		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF COCONUT CREEK	4.9992		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF COCONUT CREEK	11.5698		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF COCONUT CREEK	5.2975		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	22.0639	E	Out	In	In	In	In	Previously Evaluated, Parcel developed as part of a Broward County transportation project. Not Selected for Further Evaluation
CITY OF POMPANO BEACH	11.7555		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF SUNRISE	11.4784	K	In	In	In	Out	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	5.4931		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF SUNRISE	12.4473		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF SUNRISE	3.6492		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	5.0544		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	10.0554		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	9.6546		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	8.7311		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	5.4178		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	8.1525		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	6.1288	I	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	39.2714	N	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	11.268	N	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	7.2861	O	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	5.4761	LL	In	In	In	Out	Out	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF SUNRISE	10.3747		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
TOWN OF DAVIE	115.0825		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
TOWN OF DAVIE	53.7127		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
TOWN OF DAVIE	4.8094		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
TOWN OF SOUTHWEST RANCHES	4.945		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
SCHOOL BOARD OF BROWARD COUNTY	11.8725		In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	47.9277	HH	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Includes Large Borrow Lake, Not Selected for Further Evaluation
TOWN OF DAVIE	36.0983		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF FORT LAUDERDALE	6.1336	P	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	15.5938		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	11.3711	S	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	18.5173	T	In	In	In	In	In	Site, Site Size Limits Use to Residential Drop Off, Not Selected for Further Evaluation Due to Habitat Impacts
BROWARD COUNTY	44.2323	Y	In	In	In	In	In	Site, Site Size Limits Use to Residential Drop Off, Not Selected for Further Evaluation Due to Habitat Impacts
BROWARD COUNTY	5.3414	X	Out	In	In	In	In	No Existing Roadways Present, Site Size Can Only Accommodate Drop Off Recycling Center, Environmentally Sensitive Lands Present, Not Selected for Further Evaluation

Owner Name	Acreage	Site Identifier	Residential Buffer (0.25mi)	Residential Buffer (0.5mi)	Residential Buffer (1mi)	Airport Buffer	Floodplain	Notes
BROWARD COUNTY	9.2574	Z	Out	In	In	In	In	Previously Evaluated, Selected for Further Evaluation
BROWARD COUNTY	10.2512	Z	Out	In	In	In	In	Previously Evaluated, Selected for Further Evaluation
BROWARD COUNTY	5.1391		In	In	In	In	In	Located Directly Adjacent to Airport, Not Selected for Further Evaluation
BROWARD COUNTY	4.6768		In	In	In	In	In	Located Directly Adjacent to Airport, Airport Lighting or Other Facilities Present, Not Selected for Further Evaluation
BROWARD COUNTY	6.2957	AA	Out	In	In	In	In	Previously Evaluated, Selected for Further Evaluation
BROWARD COUNTY	4.1315		In	In	In	In	Out	Located within Airport, Not Selected for Further Evaluation
BROWARD COUNTY	6.1332	W	Out	Out	In	In	In	Previously Evaluated, Selected for Further Evaluation
BROWARD COUNTY	6.8663	Broward A	Out	In	In	In	In	Not Previously Evaluated, Filtered Out Due to Location Directly Adjacent to Airport; Within 0.5 mile and 1-mile Residential Buffers; Selected for Further Evaluation as Broward Site A.
BROWARD COUNTY	7.7027	BB	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	4.539		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
BROWARD COUNTY	11.0172	DD	In	In	In	In	In	Previously Evaluated as part of Site DD, this Parcel was within all residential buffers, not selected for further evaluation, other parcels associated with Site DD were further evaluated.
BROWARD COUNTY	7.8831	DD	Out	In	In	In	In	Previously Evaluated, Selected for Further Evaluation
BROWARD COUNTY	6.9406	EE	Out	In	In	In	In	Previously Evaluated, Selected for Further Evaluation
BROWARD COUNTY	27.2644	EE	Out	In	In	In	In	Previously Evaluated, Selected for Further Evaluation
BROWARD COUNTY	12.6417	CC	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
SCHOOL BOARD OF BROWARD COUNTY	29.1455		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
TOWN OF SOUTHWEST RANCHES	5.6497		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
TOWN OF SOUTHWEST RANCHES	5.6709		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
TOWN OF SOUTHWEST RANCHES	8.5118		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	9.4636	PP	In	In	In	Out	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF PEMBROKE PINES	14.5365	PP	In	In	In	Out	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF MIRAMAR	14.434	VV	In	In	In	Out	Out	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF MIRAMAR	20.8897		In	In	In	Out	Out	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF COOPER CITY	5.1446	KK	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
TIITF HEALTH SERVICES	6.4318		In	In	In	In	Out	Within All Residential Buffers, Not Selected for Further Evaluation
SCHOOL BOARD OF BROWARD COUNTY	6.6136		In	In	In	In	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	4.9994		In	In	In	Out	In	Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	11.1675	SS	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation
CITY OF HOLLYWOOD	9.3839	SS	In	In	In	In	In	Previously Evaluated, Within All Residential Buffers, Not Selected for Further Evaluation

Appendix L

Task 10 White Paper – Natural Areas Near Facilities

Solid Waste Authority of Broward County

Task 10 White Paper: Highlight Natural Areas Near Facilities

Solid Waste Authority of Broward County
115 South Andrews Avenue, Room 122
Fort Lauderdale, FL 33301

SCS ENGINEERS

09224106.00, Task 00010 | February 19, 2025

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1.0 INTRODUCTION/OVERVIEW

Frequent and consistent public education and outreach are critical for encouraging the reduction, reuse, recycling, or composting of municipal solid waste (MSW). These MSW management approaches are effective with reducing the volume of materials requiring disposal through waste-to-energy facilities or landfills. By integrating passive learning features like wetlands, trails, and park-like areas near waste management facilities, the Solid Waste Authority of Broward County (Authority) has the opportunity to transform these sites into community assets that foster environmental awareness and promote sustainability.

This White Paper has been prepared initially to identify education and outreach opportunities based on the approaches employed locally, regionally, and nationally concurrent with identifying potential sites based on the facility needs identified in the draft Task 4 White Paper. This White Paper will be updated as the master planning process progresses.

2.0 BACKGROUND/RATIONALE

Modern MSW management facilities and nearby natural areas can be reimagined as educational spaces. Success stories such as Freshkills Park in New York City, the Los Reales Sustainability Campus in Tucson, Arizona, and Champ Landfill in Maryland Heights, Maryland, illustrate how municipalities can not only repurpose landfills and related sites into dynamic community resources, but use active facilities to engage with and educate the community on sustainability, environmental stewardship, and biodiversity. These transformations and invitations build trust and improve public perception while contributing to higher recycling rates and enhanced community engagement.

3.0 TRANSFORMING PERCEIVED LIABILITIES INTO COMMUNITY ASSETS

Historically, MSW management facilities have been isolated due to health, safety, and other concerns. Today, however, many communities recognize the potential to transform these spaces into public resources, leveraging design elements like trails, observation decks, and interpretive signage to educate and inspire residents. Examples include:

- **Green Cay Nature Center and Wetlands:** Teeming with birds, reptiles, and mammals, this 100-acre nature preserve and constructed wetland provides educational opportunities about the habitat. Visitors have access to 1.5 miles of elevated boardwalk featuring interpretive signs about the habitat, a lecture hall, an exhibit room, and more. This park is a water reclamation facility, naturally filtering millions of gallons of wastewater each day. Parks & Recreation Green Cay Nature Center

- **Champ Landfill, MO:** An active landfill that accepts approximately one fifth of waste disposed of in the State of Missouri, Champ Landfill is a "long-standing asset in Maryland Heights, Missouri." In partnership with the City of Maryland Heights, Champ Landfill established a Sustainability Campus adjacent to the landfill. This campus is open to the public and offers – free of charge – interactive workshops, greenhouses, beehives, and a nature trail that provides an area to view active work taking place at Champ Landfill and the North Quarry. Waste Connections Sustainability Campus

- **Vista View Park, FL**: Previously a landfill, this park's hilltop sits at 65 feet above sea level and is the highest manmade elevation in Broward County. Features include an airfield, paths for outdoor enthusiasts, an equestrian trail, fishing areas, fitness facilities, and other community areas. VISTA VIEW PARK

- **Freshkills Park, NY**: Once the world's largest landfill, Freshkills now provides 2,200 acres of green space for recreation, wildlife observation, research, and community events. Freshkills Park - Recycling the land, revealing the future.

- **Cesar Chavez Park, CA**: This former landfill was transformed into a vibrant community space, complete with trails, wildlife habitats, and a visitor center that encourages environmental exploration. César Chávez Park | City of Berkeley

4.0 IDENTIFYING NATURAL AREAS TO EXPAND EDUCATIONAL OPPORTUNITIES

4.1 GIS DESKTOP REVIEW

The SCS Team conducted a desktop geographic information system (GIS) analysis to identify potential locations for integrating passive learning features near proposed MSW management facilities. The review applied exclusionary criteria, including:

- Conservation areas, Areas of Critical State Concern, Comprehensive Everglades Restoration Plan (CERP) Project areas, and other natural resource protection areas.

- Proximity to airports, surface water bodies, and community water systems.

- Existing land use and historical/archaeological/cultural areas.

- Additional considerations used in this analysis include parcel ownership, offset from residential zoning, parcel zoning, travel time to major roadways, site geometry, system location, availability of utilities, presence of a canal or major roadway onsite, and identification of floodplains.

4.2 SUMMARY OF FINDINGS

Appendix A presents the twenty-nine data sources, methodology, and screening criteria used to identify new potential parcels or parcel groupings by owner for each following facility type identified in the draft Task 4 White Paper:

- Materials Recovery Facility (500,000 TPY) – 10 suitable parcels/parcel groupings

- MRF (150,000 TPY) – 15 suitable parcels/parcel groupings

- Construction & Demolition Recycling – 10 suitable parcels/parcel groupings

- Dropoff Facility – 200 suitable parcels/parcel groupings

- Mulch/Compost – 0 suitable parcels (1-mile residential buffer covers all available parcels)

- Biochar – 10 suitable parcels/parcel groupings
- Mixed Waste Processing Facility + Anaerobic Digestion – 3 suitable parcels/parcel groupings
- Waste-to-Energy – 0 suitable parcels (acreage requirement and 0.5-mile residential buffer eliminated all options)
- Landfill – 0 suitable parcels (1-mile residential buffer covers all available parcels)
- Covered Aerated Static Pile Composting – 2 suitable parcels/parcel groupings
- Transfer Station – 71 suitable parcels/parcel groupings

Maps identifying potential locations for each of the facility types identified above are presented in **Appendix B**.

4.3 INTEGRATION OF WETLANDS, TRAILS, AND PARKS WITH FACILITIES

Based on the research conducted by the SCS Team, the following passive learning centers at MSW management facilities include:

- **Wetlands and Trails**: Boardwalks and viewing platforms can educate visitors about natural ecosystems and waste management technologies.
- **Interactive Exhibits**: Demonstrations of methane capture, waste-to-energy systems, and composting processes.
- **Living Laboratories**: Spaces for conservation research and STEM education.

5.0 KEY FINDINGS

The SCS Team found that community engagement improves public understanding of MSW management programs and systems, boosting recycling rates by as much as 20%. In addition, it was found that repurposed land enhances biodiversity, stormwater management, and recreational access.

6.0 ADDITIONAL RESOURCES

The following case studies and resources demonstrate successful integrations of educational and recreational features into waste management sites, offering valuable lessons for the Authority's goal to activate its MSW management facilities as passive learning centers:

- SWA Greenway Trail System: This trail system, developed by the Solid Waste Authority of Palm Beach County, is an excellent example of incorporating trails and public access into the surroundings of waste management facilities. Visitors can explore scenic pathways that showcase native vegetation while learning about solid waste management and recycling technologies through interpretive signage and guided tours.

- Mount Trashmore Park: Located in Virginia Beach, Mount Trashmore Park transformed a closed landfill into a recreational hub. The site features walking trails, a skate park, picnic areas, and a beautiful overlook. It also includes educational exhibits that highlight the site's history and the environmental practices that made its redevelopment possible, demonstrating how waste can become a resource.

- Douglas Environmental Center: This center in Alexandria, Minnesota, integrates hands-on environmental education with waste management operations. The facility provides interactive exhibits, classroom spaces, and tours of its recycling and waste processing operations. It serves as a model for how to engage students and the community, fostering a better understanding of sustainable practices.

7.0 RECOMMENDATIONS

To ensure the successful integration of passive learning features into the Authority's MSW facilities, the following recommendations are proposed:

- **Integrate Educational Features During the Design Phase:** Begin planning educational and recreational features alongside the design of new waste management facilities to ensure seamless integration. Features could include interpretive trails, wetlands, and outdoor classrooms. Early involvement of environmental educators, engineers, and urban planners will help align the designs with community and ecological goals.

- **Engage Key Stakeholders:** Partner with local schools, nonprofit organizations, environmental groups, and community leaders to shape educational programs. For example, school groups could assist in developing age-appropriate tours and interactive learning modules, while nonprofits could host events such as clean-up days or citizen science projects.

- **Follow Best Practices from Successful Transformations:** Learn from other municipalities that have successfully converted waste sites into community assets. Implement strategies such as creating accessible trails, designing safe observation platforms, and incorporating renewable energy exhibits. Case studies such as Freshkills Park and Mount Trashmore provide valuable insights into overcoming challenges and maximizing public benefits.

- **Promote Sustainability through Hands-On Programs:** Develop hands-on, experiential learning opportunities, such as composting workshops, methane gas capture demonstrations, and recycling technology exhibits. These programs can cultivate a deeper understanding of environmental practices and encourage behavior changes at home.

- **Enhance Accessibility and Aesthetic Appeal:** Design features that prioritize accessibility and visual appeal to attract a broad range of visitors. Incorporate landscaping, shaded areas, and signage that provide clear and engaging educational content without overwhelming visitors with technical jargon.

- **Respect and Protect Sensitive Ecosystems:** Use GIS analyses and site assessments to identify high-value ecological areas, such as wetlands and conservation zones. Develop low-impact infrastructure, such as raised boardwalks and interpretive viewing platforms, to minimize disruption to these habitats while showcasing their value as part of a sustainable waste management system.

8.0 NEXT STEPS

To advance the proposed initiative, the following next steps are recommended:

- **Collaborate with Environmental Consultants and Local Stakeholders:** Work with environmental specialists and consultants to refine the conceptual designs of the passive learning features, including direct engagement with local stakeholders. This includes determining optimal locations for trails, wetlands, and recreational areas based on GIS desktop reviews and field assessments as well as desired programming that meets local needs.

- **Conduct Public Outreach and Stakeholder Engagement:** Host workshops and community meetings to inform residents about the project and gather their input. Include educators, local businesses, and nonprofit organizations in discussions to ensure the designs meet diverse community needs.

- **Develop Detailed Site Plans and Budget Proposals:** Prepare comprehensive site plans that incorporate educational spaces, conservation areas, and recreational features. Develop cost estimates for construction, maintenance, and programming to support funding applications or grants.

- **Establish Partnerships and Secure Funding:** Build partnerships with organizations such as the Trust for Public Land or environmental foundations to secure funding. Explore grant opportunities, public-private partnerships, and sponsorships to support the development and maintenance of the project.

- **Pilot Test Educational Programs:** Launch small-scale pilot programs, such as guided tours of an existing waste facility or a composting workshop. Use these initiatives to gather feedback and refine larger programming efforts.

- **Monitor Progress and Refine Strategies:** Develop a framework for monitoring visitor engagement, educational impact, and environmental benefits over time. This could include surveys, recycling rate analysis, and ecological assessments. Use the data to adjust programs and expand successful initiatives

Appendix A

GIS Data Sources and Methodology

GIS Data Sources and Methodology

1) Aviation Facilities

Summary: The dataset provides users with information about airport locations and attributes and can be used for national and regional analysis applications.

https://services.arcgis.com/xOi1kZaI0eWDREZv/ArcGIS/rest/services/NTAD_Aviation_Facilities/FeatureServer

The Aviation Facilities dataset is updated every 28 days from the Federal Aviation Administration (FAA) and is part of the U.S. Department of Transportation (USDOT)/Bureau of Transportation Statistics (BTS) National Transportation Atlas Database (NTAD). The Aviation Facilities dataset is a geographic point database of all official and operational aerodromes in the United States and U.S. Territories. Attribute data is provided on the physical and operational characteristics of the aerodrome, current usage including enplanements and aircraft operations, congestion levels and usage categories. This geospatial data is derived from the FAA's National Airspace System Resource Aeronautical Data Product. For more information about these data, please visit: https://www.faa.gov/air_traffic/flight_info/aeronav/Aero_Data/NASR_Subscription.

2) Natural, Cultural, and Historical Resources

Summary: A group layer containing the layer themes from the Natural, Cultural, and Historical Resources developed by Balmoral and FDEP. This group is part of the assets from the Statewide Critical Assets Dataset.

https://services1.arcgis.com/nRHtyn3uE1kyzoYc/arcgis/rest/services/Natural__Cultural__and_Historical_Resources_2/FeatureServer

This group of layers was developed by the Balmoral Group and contains the natural, cultural, and historical resources critical assets layers for Florida as defined in 380.093(2)(a) Florida Statutes. The layers were sourced from various public State of Florida land use, Florida State Parks, State of Florida inventory of historical structures, and Federal Sources. Natural, cultural, and historical resources critical assets include conservation lands, parks, shorelines, surface waters, wetlands, and historical and cultural assets. Typically, the data are utilized in various vulnerability assessments in evaluating the exposure and sensitivity from combined events of sea level rise, precipitation, major storms, and flooding. The data will also be used in efforts to complete a comprehensive statewide assessment for the State of Florida.

For descriptions of each data layer, please visit https://geodata.dep.state.fl.us/maps/eced1debc5d54b19b556de516cace8cf/about.

3) Broward County Public Schools

Summary: Locations of all traditional elementary, middle, and high school locations, excluding charters, private schools, and centers.

https://bcgishub.broward.org/server/rest/services/GeoHubDownloads/Broward_County_Schools/FeatureServer

The locations of all Broward County Public School (BCPS) System schools, including zone information, whether the school is bounded, contact information, County Commissioner information, and inaugural year. This data was last updated for the 2016-2017 school year and will be updated as needed. The BCPS is the sixth-largest school district in the nation and the second largest in the State of Florida and is Florida's first fully accredited school system since 1962, and has nearly 270,000 students and approximately 175,000 adult students in 241 schools, centers and technical colleges, and 89 charter schools. BCPS serves a diverse student population, representing 204 different countries and 191 different languages.

Source: School Board of Broward County

Effective Date: 07/07/2018

Last Update: March 27, 2024

Update Cycle: As needed

4) Broward County Assisted Living Facilities and Nursing Homes

Summary: Location data containing Assisted Living Facilities and Nursing Homes considered part of the critical infrastructure in Broward County.

The data was created by geocoding a list of facility location addresses derived from the Florida Agency for Health Care Administration (ACHA) list and FPL premise list against a composite address locator. Some addresses were matched on address points, parcel centroids while others were placed according to the street centerline address range. Attributes include classification of critical and noncritical infrastructures, premise number, name and location address. The points representing the location of infrastructure in this data is approximate.

Source: Florida Agency for Health Care Administration (ACHA), Florida Power and Light (FPL)

Effective Date: 05/2018

Last Update: November 12, 2024

Update Cycle: Quarterly

5) Broward County City Parks

Summary: Locations of all city-owned and operated parks in Broward County, Florida.

The GIS Section reviews the layer in support of the EOC and the Urban Planning Division. The data is checked for inclusion and geometric placement accuracy. The GIS Section is no longer updating City Parks 100%. We will be reviewing a select handful of parks each year. Generally, we will begin our update schedule with the largest cities first, but a good city parks source may alter that schedule. The years listed below indicate which cities have been updated.

2009: All parks corrected to parcels. Corrected/updated Weston with T. Gates data.

2010: The cities' parks updated included Hollywood, Pompano Beach, and Hollywood.

The review technique was a review and/or incorporation of geodata from Ft. Lauderdale and website information incorporation from Pompano and Hollywood.

2011: Davie Parks updated and corrected based on Irene Degroot's shapefile and aerials. Wilton Manors update complete, city manager's office said pocket parks are to be expected soon. West Park parks reflect parcels - note Mary Saunders Park is a very irregular shape, made up of many rights-of-way and will be an exception to our parcel-based rule.

2013: Toni Peyton said there were no changes to county parks since Miramar Pinelands. She requested a map of POD parks. Pembroke Pines - reviewed park inventory, park map locator, and spoke with Lori of Chuck Vones' (Dir. Parks and Rec) office. Reviewed Miramar Park Inventory.

2014: Reviewed and updated Coral Springs, Lauderdale By the Sea, Pembroke Park, Pembroke Pines, Lighthouse Point, Fort Lauderdale, Coconut Creek, and West Park.

2015: Reviewed 05/15/15

2021: Updated by BCGIS - Ruth Rothkoph Park and Lieberman Botanical Park in Lauderhill.

Source: BCGIS

Last Update: 08/03/2021

Update Cycle: As needed

6) Colleges and Universities

https://services2.arcgis.com/FiaPA4ga0iQKduv3/arcgis/rest/services/Colleges_and_Universities_View/FeatureServer

This feature layer, utilizing data from the National Center for Education Statistics (NCES), displays colleges and universities in the U.S. and its territories. This layer contains directory information for every institution in the 2021-22 IPEDS universe. Includes name, address, city, state, zip code and various URL links to the institution's home page, admissions, financial aid offices and the net price calculator. Identifies institutions as currently active, institutions that participate in Title IV federal financial aid programs for which IPEDS is mandatory. It also includes variables derived from the 2021-22 Institutional Characteristics survey, such as control and level of institution, highest level and highest degree offered and Carnegie classifications.

7) Broward County State Parks

Summary: Location and extents of county-owned and operated parks.

The locations of all sixty-two county-owned and operated parks, last updated March 2013 when the Lafayette Park boundary changed. This layer was reviewed by the Parks and Recreation Division of Broward County on 5/15/2015 with no updates required. This layer will be updates as park boundaries change or new parks are added to Broward County.

Source: Parks and Recreation Division of Broward County

Effective Date: 03/2013

Last Update: November 12, 2024

Update Cycle: As needed

8) Surface Water Class Boundaries

Service Description: This service contains the following layers: Surface Water Alternative (SSAC) (Lines) Surface Water Alternative (SSAC) (Areas) Surface Water Class Boundaries (lines) Surface Water Class Boundaries (areas)

Description: All of Florida's surface waters are classified according to designated uses (Classes I-V). Water quality criteria that support the classes (and therefore, uses) apply uniformly to all waters within the state that have the same classification. Florida recognizes that with the variety of waters found here and a broad approach to them, there may be situations where a generally applicable statewide criterion may not be appropriate for a waterbody or portion of a waterbody. A Site Specific Alternative Criterion, or SSAC, is a water quality criterion developed for a particular waterbody or segment of a waterbody that is designed to more accurately reflect site specific conditions. Criteria, including site specific criteria, are one of the components of Florida's surface water quality standards, and are intended to protect designated and existing uses of the state waters. Development of an approvable site specific criterion is dependent on a demonstration that the different water quality criterion is more appropriate for the waterbody than the one normally used for the classification. A SSAC recognizes and accounts for the specific needs of the biological community native to the waterbody to make sure they are fully protected. When approved, a SSAC is used instead of (or sometimes in conjunction with) the surface water criterion that applies to the waters for that classification. Limits to use of the layer: Complete descriptions of SSACs are not included in the attribute table, but are found here at http://www.dep.state.fl.us/water/wqssp/ssac-list.htm for Type I SSACs, and in rule 62-302.800, FAC for Type II SSACs. This data layer should be used on conjunction with the surface water classification data layers (poly and line).

Class I and II surface water classification. The Clean Water Act requires that the surface waters of each state be classified according to designated uses. Florida has six classes with associated designated uses, which are arranged in order of degree of protection required: Class I - Potable Water Supplies Fourteen general areas throughout the state including: impoundments and associated tributaries, certain lakes, rivers, or portions of rivers, used as a drinking water supply. Class II - Shellfish Propagation or Harvesting Generally coastal waters where shellfish harvesting occurs. For a more detailed description of classes and specific waterbody designations, see 62-302.400.

Source: FDEP

9) Areas of Critical State Concern

https://ca.dep.state.fl.us/arcgis/rest/services/Map_Direct/Program_Support/MapServer/5

This data represents the state of Florida's areas of critical state concern. The Areas of Critical State Concern Program protects resources and public facilities of major statewide significance. Locations include: City of Apalachicola, City of Key West and the Florida Keys, The Green Swamp, and The Big Cypress Swamp.

To provide generalized boundaries for Florida's Areas of Critical State Concern. This data is to be used for general information and planning purposes. This product is for reference purposes only and is not to be construed as a legal document or survey instrument.

Feature layer by FDEPMapDirect

Last Update: Nov 16, 2018

10) Broward County Property Appraiser GIS Parcel Data

Summary: Purchased from Broward County Property Appraiser and joined with tax roll data

11) Public Water Supply

Summary: Track public water supply in the State of Florida, excluding Federally owned facilities.

FDEP Open Data Administrator

Florida Department of Environmental Protection

Last Updated: February 27, 2020

The data for this dataset is updated daily. The date(s) displayed in the details section on our Open Data Portal is based on the last date the metadata was updated and not the refresh date of the data itself.

Statewide coverage of PWS Wells, excluding Federally owned facilities.

Division of Water Resource Management (DWRM)

12) SFWMD Alternative Water Supply (AWS) Projects

https://geoweb.sfwmd.gov/agsext1/rest/services/SFWMD_ProjectsAndBoundaries/SFWMD_Strategic_AWS_Local_Projects/FeatureServer

Point locations for SFWMD Strategic, Alternative Water Supply, and Local / State Cost Share Projects, and SFER SFWMD Projects permitted by FDEP.

Description: This component of the Cooperative Funding Program is focused on supporting the development of AWS (Alternative Water Supply) projects that will diversify the supply while reducing dependence on freshwater resources.

Water Conservation – Formerly known as the Water Savings Incentive Program (WaterSIP), this component of the Cooperative Funding Program is continuing to support water conservation efforts of public and private water providers or users.

Copyright Text: SFWMD, Geospatial Services: Geospatial Services is a unit within the South Florida Water Management District's Information Technology Bureau (ITB). Geospatial Services manages and maintains enterprise geospatial services, products, and data and is governed by the ITB's Policies and Procedures.

13) Consumptive Use Permit Facilities

This web layer displays the Water Use Permitting Facilities that consist of wells, pumps and culverts. These facilities are within the 16 counties located in the jurisdictional area of the South Florida Water Management District.

This dataset is made available to the public in response to the Florida Public Records Law, Florida Statutes, Chapter 119. Any information, including but not limited to software and data, received from the South Florida Water Management District ("District") is provided "As Is" without warranty of any kind, and the District expressly disclaims all express and implied warranties, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. The entire risk as to the results and performance of any information obtained from the District is entirely assumed by the recipient.

https://geoweb.sfwmd.gov/agsext1/rest/services/Regulation_ApplicationPermits/Consumptive_Use_Permit_Facilities/MapServer

14) DOR Codes – Broward County Property Appraiser

https://bcpa.net/use_code.asp

This website features a comprehensive list of all DOR codes for Broward County.

15) North American Landfills

Summary: The North American Landfills map represents the approximate location of landfills and dumps in North America, based mostly on governmental data in Canada, Mexico, and the United States.

https://services7.arcgis.com/oF9CDB4IUYF7Um9q/arcgis/rest/services/North_American_Landfills/FeatureServer

Multiple sources of information were used to find the location of landfills in North America, especially for Canada. All data sources are acknowledged and referenced in a document accompanying the map files (North American Landfills - Data Sources.docx).

16) USA Flood Hazard Reduced Set

Description: The Federal Emergency Management Agency (FEMA) produces Flood Insurance Rate maps and identifies Special Flood Hazard Areas as part of the National Flood Insurance Program's floodplain management. Special Flood Hazard Areas have regulations that include the mandatory purchase of flood insurance.

Phenomenon Mapped: Flood Hazard Areas

Coordinate System: Web Mercator Auxiliary Sphere

Extent: Contiguous United States, Alaska, Hawaii, Puerto Rico, Guam, US Virgin Islands, Northern Marianas Islands and American Samoa.

Visible Scale: The layer is limited to scales of 1:1,000,000 and larger. Use the USA Flood Hazard Areas imagery layer for smaller scales.

Source: Federal Emergency Management Agency

Publication Date: October 5, 2022

This layer is derived from the October 5, 2022 version of the National Flood Hazard Layer feature class S_Fld_Haz_Ar. The data were aggregated into eight classes to produce the Esri Symbology field based on symbology provided by FEMA. All other layer attributes are derived from the National Flood Hazard Layer.

The layer was projected to Web Mercator Auxiliary Sphere, then the repair geometry geoprocessing tool was run on it. Its resolution was set to 0.0001 meter.

To improve performance Flood Zone values "Area Not Included", "Open Water", "D", "NP", and No Data were removed from the layer. Areas with Flood Zone value "X" subtype "Area of Minimal Flood Hazard" were also removed. An imagery layer created from this dataset provides access to the full set of records in the National Flood Hazard Layer.

17) Transportation

https://services2.arcgis.com/FiaPA4ga0iQKduv3/arcgis/rest/services/Transportation_v1/FeatureServer

This feature layer, utilizing National Geospatial Data Asset (NGDA) data from the U.S. Census Bureau, displays primary roads, secondary roads, local roads and railroads in the United States. According to the USCB, "This includes all primary, secondary, local neighborhood, and rural roads, city streets, vehicular trails (4wd), ramps, service drives, alleys, parking lot roads, private roads for service vehicles (logging, oil fields, ranches, etc.), bike paths or trails, bridle/horse paths, walkways/pedestrian trails, and stairways."

Data currency: This cached Esri federal service is checked weekly for updates from its enterprise federal source (TIGERweb/Transportation) and will support mapping, analysis, data exports and OGC API – Feature access.

NGDAID: 155 (Series Information for All Roads County-based TIGER/Line Shapefiles, Current)

OGC API Features Link: (Transportation - OGC Features) copy this link to embed it in OGC Compliant viewers

For more information, please visit: Census Feature Class Codes (CFCC)

For feedback please contact: Esri_US_Federal_Data@esri.com

18) NGDA Data Set

This data set is part of the NGDA Governmental Units, and Administrative and Statistical Boundaries Theme Community. Per the Federal Geospatial Data Committee (FGDC), this theme is defined as the "boundaries that delineate geographic areas for uses such as governance and the general provision

of services (e.g., states, American Indian reservations, counties, cities, towns, etc.), administration and/or for a specific purpose (e.g., congressional districts, school districts, fire districts, Alaska Native Regional Corporations, etc.), and/or provision of statistical data (census tracts, census blocks, metropolitan and micropolitan statistical areas, etc.). Boundaries for these various types of geographic areas are either defined through a documented legal description or through criteria and guidelines. Other boundaries may include international limits, those of federal land ownership, the extent of administrative regions for various federal agencies, as well as the jurisdictional offshore limits of U.S. sovereignty. Boundaries associated solely with natural resources and/or cultural entities are excluded from this theme and are included in the appropriate subject themes."

For other NGDA Content: Esri Federal Datasets

19) Florida State Park Boundaries

https://ca.dep.state.fl.us/arcgis/rest/services/OpenData/PARKS_BOUNDARIES/MapServer/0

Description: This feature class contains lands that make up the State Parks and State Trails in Florida as of September 1st, 2017.
Copyright Text: Florida Department of Environmental Protection, Division of Recreation and Parks, Office of Park Planning

20) Critical Habitat Polygon in Florida (CRITHAB POLY FL)

https://gis-fws.opendata.arcgis.com/datasets/fws::crithab-poly-fl/about

Critical habitat polygon in Florida is downloaded from U.S. fish & wildlife service ECOS environmental conservation online system.

When a species is proposed for listing as endangered or threatened under the Endangered Species Act, the U.S. Fish and Wildlife Service must consider whether there are areas of habitat believed to be essential the species' conservation. Those areas may be proposed for designation as "critical habitat." Critical habitat is a term defined and used in the Act. It is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery. An area is designated as "critical habitat" after the Service publishes a proposed Federal regulation in the Federal Register and receives and considers public comments on the proposal. The final boundaries of the critical habitat are also published in the Federal Register. Critical habitat are areas considered essential for the conservation of a listed species. Federal agencies are required to consult with the U.S. Fish and Wildlife Service on actions they carry out, fund, or authorize to ensure that their actions will not destroy or adversely modify critical habitat. These areas provide notice to the public and land managers of the importance of these areas to the conservation of a listed species. Special protections and/or restrictions are possible in areas where Federal funding, permits, licenses, authorizations, or actions occur or are required.

21) US Fish and Wildlife Service Endangered Species Critical Habitat Final Tiles (FWS HQ ES Critical Habitat)

https://gis-fws.opendata.arcgis.com/maps/fws::fws-hq-es-critical-habitat-final-tiles/about

This provides tiled services for final critical habitat areas.

When a species is proposed for listing as endangered or threatened under the Endangered Species Act, the U.S. Fish and Wildlife Service must consider whether there are areas of habitat believed to be essential the species' conservation. Those areas may be proposed for designation as "critical habitat." Critical habitat is a term defined and used in the Act. It is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery. An area is designated as "critical habitat" after the Service publishes a proposed Federal regulation in the Federal Register and receives and considers public comments on the proposal. The final boundaries of the critical habitat are also published in the Federal Register. Critical habitat are areas considered essential for the conservation of a listed species. Federal agencies are required to consult with the U.S. Fish and Wildlife Service on actions they carry out, fund, or authorize to ensure that their actions will not destroy or adversely modify critical habitat. These areas provide notice to the public and land managers of the importance of these areas to the conservation of a listed species. Special protections and/or restrictions are possible in areas where Federal funding, permits, licenses, authorizations, or actions occur or are required.

For access to the feature layer, visit this link:
https://fws.maps.arcgis.com/home/item.html?id=794de45b9d774d21aed3bf9b5313ee24

For questions about this dataset, please contact: fwhq_ecos_support@fws.gov

22) Critical Habitat for Threatened and Endangered Species

https://hub.arcgis.com/maps/9d0965dae6a64f38b1af80c2f7ea2efe/about

This National Geospatial Data Asset (NGDA) dataset, shared as a U.S. Fish and Wildlife Service (FWS) feature layer, displays proposed and designated critical habitat under the U.S. Endangered Species Act.

This National Geospatial Data Asset (NGDA) dataset, shared as a U.S. Fish and Wildlife Service (FWS) feature layer, displays proposed and designated critical habitat under the U.S. Endangered Species Act. According to the FWS, "When the Fish and Wildlife Service proposes a species for listing under the Endangered Species Act, we are required to consider whether there are geographic areas that contain essential features on areas that are essential to conserve the species." Those areas may be proposed for designation as critical habitat. Critical habitat is a term defined and used in the Act. It is a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery. An area is designated as "critical habitat" after the FWS publishes a proposed Federal regulation in the Federal Register and receives and considers public comments on the proposal. The final boundaries of the critical habitat are also published in the Federal Register. Federal agencies are required to consult with the FWS on actions they carry out, fund, or authorize to ensure that their actions will not destroy or adversely modify critical habitat. These areas provide notice to the public and land managers of the importance of these areas to the conservation of a listed species. Special protections and/or restrictions are possible in areas where Federal funding, permits, licenses, authorizations, or actions occur or are required.

23) Wellfield Protection Zones

Summary: This coverage depicts Broward County regulatory Wellfield Protection Zones.

Credit: Broward County Pollution Prevention, Remediation and Air Quality Division

Description: This coverage depicts Broward County regulatory Wellfield Protection Zones. The Wellfield Protection Zone layer was originally created in the 1997 using a hydraulic model to create Zones 1, 2 and 3 for supply wells installed to that point. The wellfield map was approved on February 16, 2001. Subsequent supply wells installed after the model was first run did not have protection zones. In June 2013, the Broward County Commission approved a revision to the wellfield protection ordinance that allows protection for those wells installed after the hydraulic model was run that did not have protection zones. Additionally, the ordinance revision allows the removal of protection zones for abandoned supply wells. The ordinance revision defines the new wellfield zones of influence as follows:

Zone 1 means the wellfield protection area shown on the zones of influence map approved on February 16, 2001 for water wells included on that map, and within 250 feet from an existing water well for wells not included on that map.

Zone 2 means the wellfield protection area shown on the zones of influence map approved on February 16, 2001 for water wells included on that map, and situated between the outer boundary of Zone 1 and 500 feet from an existing water well for wells not included on that map.

Zone 3 means the wellfield protection area shown on the zones of influence map approved on February 16, 2001 for water wells included on that map, and situated between the outer boundary of Zone 2 and 1320 feet from an existing water well for wells not included on that map.

24) Public Water Supply (PWS) Wells (Non-Federal)

https://geodata.dep.state.fl.us/datasets/e0b832a3c8ca45598c79a9b290653bd7_2/explore

Florida Department of Environmental Protection

Summary: Track public water supply in the State of Florida, excluding Federally owned facilities.

The data for this dataset is updated daily. The date(s) displayed in the details section on our Open Data Portal is based on the last date the metadata was updated and not the refresh date of the data itself.

Statewide coverage of PWS Wells, excluding Federally owned facilities.

25) Florida Conservation Lands

https://services.arcgis.com/9Jk4Zl9KofTtvg3x/arcgis/rest/services/FL_Conservation_Lands_web/FeatureServer

Service Description: The Florida Conservation Lands dataset includes boundaries and statistics for more than 3,000 federal, state, local, and private managed areas that are being managed at least partially for conservation purposes.

Description: View Full Metadata
Note: This dataset has been modified from the original feature class to facilitate display and should not be exported to GIS; please download from the link below.

The Florida Natural Areas Inventory (FNAI) is the primary source for information on Florida's conservation lands. The Conservation Lands database, also known as Florida Managed Areas (FLMA), includes boundaries and statistics for more than 3,000 federal, state, local, and private managed areas, all provided directly by the managing agencies. The database includes lands that FNAI has identified as having natural resource value and that are being managed at least partially for conservation purposes. National parks, state forests, wildlife management areas, local and private preserves are examples of the managed areas included. This dataset is maintained and published by FNAI with funding from the Florida Dept of Environmental Protection. This dataset is updated quarterly.
Citation: Florida Natural Areas Inventory. Florida Conservation Lands, September 2024.
Funded by the Florida Department of Environmental Protection.
Copyright Text: Florida Natural Areas Inventory

26) Florida Board of Trustees (BOT) Projects

https://services1.arcgis.com/nRHtyn3uE1kyzoYc/arcgis/rest/services/FF_BOT_DEC_2023/FeatureServer

Service Description: To provide a statewide GIS data layer for all Florida Forever Board of Trustees projects on the current list approved by the Acquisition and Restoration Council (ARC).

Description: FLORIDA FOREVER BOT PROJECTS (layer name FFBOT): This is a polygon data layer for Florida Forever Board of Trustees (BOT) projects (formerly known as CARL projects). This data layer is site-based and contains boundaries of all Florida Forever BOT projects approved by the State's Acquisition and Restoration Council as of December 8, 2023. These lands have been proposed for acquisition because of outstanding natural resources, opportunity for natural resource-based recreation, or historical and archaeological resources. However, these areas may not be currently managed for their resource value. Portions of these projects may have already been acquired by the State and/or its acquisition partners.

Copyright Text: Florida Natural Areas Inventory

27) Broward County Trafficways

https://geohub-bcgis.opendata.arcgis.com/datasets/73081da969d04057a6b53d3744f4c96c_0/explore?location=26.130845%2C-80.203281%2C10.96

Trafficways in Broward County. To accommodate the impacts of new development, right-of-way is required of developing parcels to provide for an adequate regional roadway network. ROWINFO is how the Trafficway Varies from the standard. This dataset provides a basis for a roadway right-of-way preservation plan.

Source: Broward County Planning Council

Effective Date: 08/22/2019

Update Cycle: As needed

28) Broward County Streets

https://geohub-bcgis.opendata.arcgis.com/datasets/efb7d33a543447fa935e30c6528050e6_0/explore

Summary: A catalog of street arcs, ranges, names. Utilized for the determination and geocoding for assignment of addresses.

NOTE: Beginning with the May 12, 2014 update, Streets data include the full extent of Broward County.

WARNING: Street name aliases are represented by duplicate arcs stacked upon one another. This dataset should not be used to derive statistics for total lengths (such as mileage) in Broward County.

The initial streets dataset geometry was created by using a variety of sources: digitized section sheets and plats, air photography, Tiger files, field checks and sketch maps - among others. Efforts are being made to improve positional accuracy and the correctness of address attributes. This update includes all annexations as of the effective date.

29) USA Wetlands

https://www.arcgis.com/home/item.html?id=f3fe92adaa4e4acda0f31e3582d4c55d

Description: Wetlands are areas where water is present at or near the surface of the soil during at least part of the year. Wetlands provide habitat for many species of plants and animals that are adapted to living in wet habitats. Wetlands form characteristic soils, absorb pollutants and excess nutrients from aquatic systems, help buffer the effects of high flows, and recharge groundwater. Data on the distribution and type of wetland play an important role in land use planning and several federal and state laws require that wetlands be considered during the planning process.

The National Wetlands Inventory (NWI) was designed to assist land managers in wetland conservation efforts. The NWI is managed by the US Fish and Wildlife Service.

Methodology:

- Filtered Surface Water Class Boundaries, lines and areas, for Class 1
- Ran buffer 3,000 ft from Class 1 surface waters (lines and areas)
- Filtered USA Flood Hazard Reduced Set for 1% Annual Chance Flood Hazard
- Create a 4 statute-mile buffer around public airports
- Joined Broward County parcels with tax roll data
- Dissolved the parcels by owner, exploded, and calculated acreages by owner
- Removed all parcels owned by SFWMD, FDOT and any parcels that fell within CERP boundary
- Removed all parcels less than five acres (in doing so, we may be eliminating parcels that could be combined to equal five or more)
- Erase parcels that coincide with wetlands, floodplain, and wellfield protection zones
- Recalculate areas and eliminate areas that are now less than 5 acres
- During evaluation, recreational facilities/areas with open space (e.g. sport fields, golf courses, forests, parks) and were excluded but may warrant further consideration in the absence of other suitable parcels
- Evaluate remaining parcels based on DOR code and eliminate unsuitable ones
- Pulled municipal-owned parcels for further evaluation by utilizing the word “City,” “County,” “Hospital,” “Water,” and “School” in the ownership field
- No threatened and endangered species features or locations fall within selected parcels based on available GIS data from US Fish and Wildlife and Florida Fish and Wildlife
- Symbolized suitable parcels using the following increments: less than 20 acres, 20-30 acres, 30-40 acres, 40-75 acres, 75-100 acres, 100-1000 acres, 1000+ acres
- Added fields to evaluate suitability of parcel by facility type
    - Airport buffer (In/Out)
    - Floodplain (In/Out)
    - Residential Zoning Buffer (In/Out 1.0 mi, 0.5 mi, 0.25 mi)
    - Proximity to major roadway (Less than or greater than 5 miles)
        - All parcels fell within 5 miles of a major roadway
    - Fields by facility type (Yes/No)
        - MRF (500,000 TPY) – 10 suitable parcels/parcel groupings
        - MRF (150,000 TPY) – 15 suitable parcels/parcel groupings
        - C&D Recycling – 10 suitable parcels/parcel groupings
        - Dropoff Facility – 200 suitable parcels/parcel groupings

        - Mulch/Compost – 0 suitable parcels (1-mile residential buffer covers all available parcels)
        - Biochar – 10 suitable parcels/parcel groupings
        - MWP+AD – 3 suitable parcels/parcel groupings
        - WTE – 0 suitable parcels (acreage requirement and 0.5-mile residential buffer eliminated all options)
        - Landfill – 0 suitable parcels (1-mile residential buffer covers all available parcels)
        - CASP – 2 suitable parcel/parcel groupings
        - Transfer Station – 71 suitable parcels/parcel groupings
    - Natural areas within 1-mile by facility type
        - MRF (500,000 TPY) – 31 natural areas
        - MRF (150,000 TPY) – 34 natural areas
        - C&D Recycling – 31 natural areas
        - Dropoff Facility – 445 natural areas
        - Biochar – 31 natural areas
        - MWP+AD – 18 natural areas
        - CASP – 18 natural areas
        - Transfer Station – 230 natural areas

GIS Site Screening Criteria Table

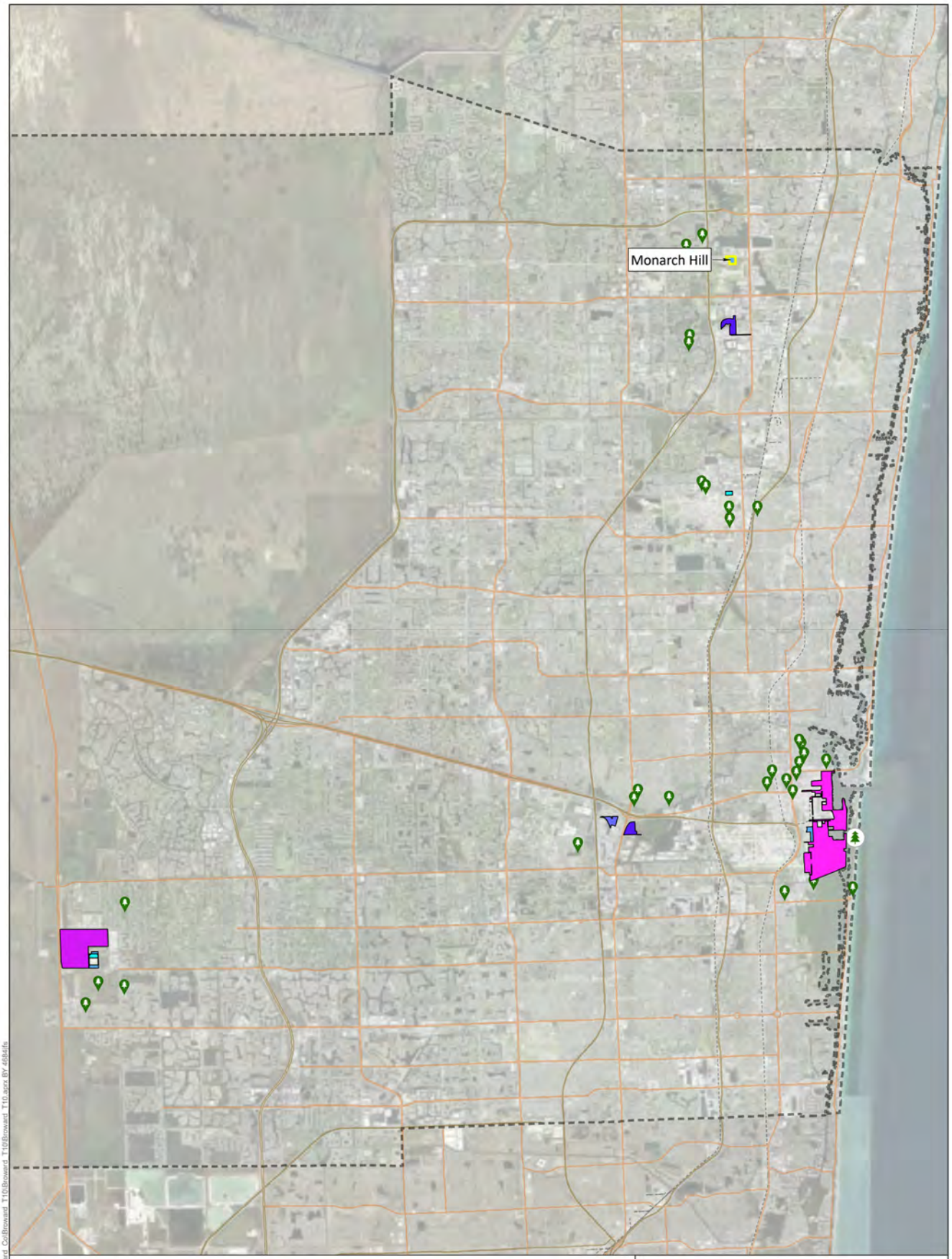
Siting Criteria	MRF	MRF	C&D Recycling	Dropoff Facility	Mulch or Compost	Biochar	MWP+AD	WTE	Landfill	CASP	Transfer Station
Capacity (TPY)	*500k*	*150k*	*450k*	*15k*	*150k*	*30k*	*160k*	*1.33M*	*1.33M*	*150k*	*1.24M*
Min. Site Area (Ac)	30	20	30	5	100		20	24*	1000	75	15
Parcel Ownership	No more than two parcels and two owners										
Zoning	Vacant, Industrial, Commercial, and Agricultural (ideal but not limited to)										
Distance to Major Road	Exclude properties more than five miles from a collector or arterial road										
Site Geometry	Sites should generally be rectangular in shape										
Proximity to Airport	N/A	N/A	N/A	N/A	N/A	N/A	N/A	>4 miles	>4 miles	N/A	N/A
System Location	Site should not be located at the edges of the County or far away from collection areas										
Wetlands & Surface Waters Onsite	No	No	No		No	No	No	No	No	No	No
Threatened & Endangered Species	No	No	No	No	No	No	No	No	No	No	No
CERP Project Area	No	No	No	No	No	No	No	No	No	No	No
Wellfield Protection Areas	No	No	No	No	No	No	No	No	No	No	No
Floodplain								No	No		
Offset from Residential Zoning	0.25 mi	0.25 mi	0.25 mi	N/A	1.0 mi	0.5 mi	0.5 mi	0.5 mi	1.0 mi	0.5 mi	

*The minimum area is stated as 24 acres as the closed Wheelabrator North Recovery Facility was situated on a parcel of this size. New WTE facility sites should be no smaller than 30 acres.

Shaded siting criteria indicate a regulatory requirement.

Appendix B

Potential Facility Siting Maps



Legend

Suitable Parcels

Acreage

- ≤ 20 acres
- 20-30 acres
- 30-40 acres
- 40-75 acres
- 100-1,000 acres
- > 1,000 acres

Natural Areas within Mile of Suitable Parcels

- Broward County State Parks
- Broward County City Parks
- Biochar
- County Boundary

N W E S

0 1 2 Miles

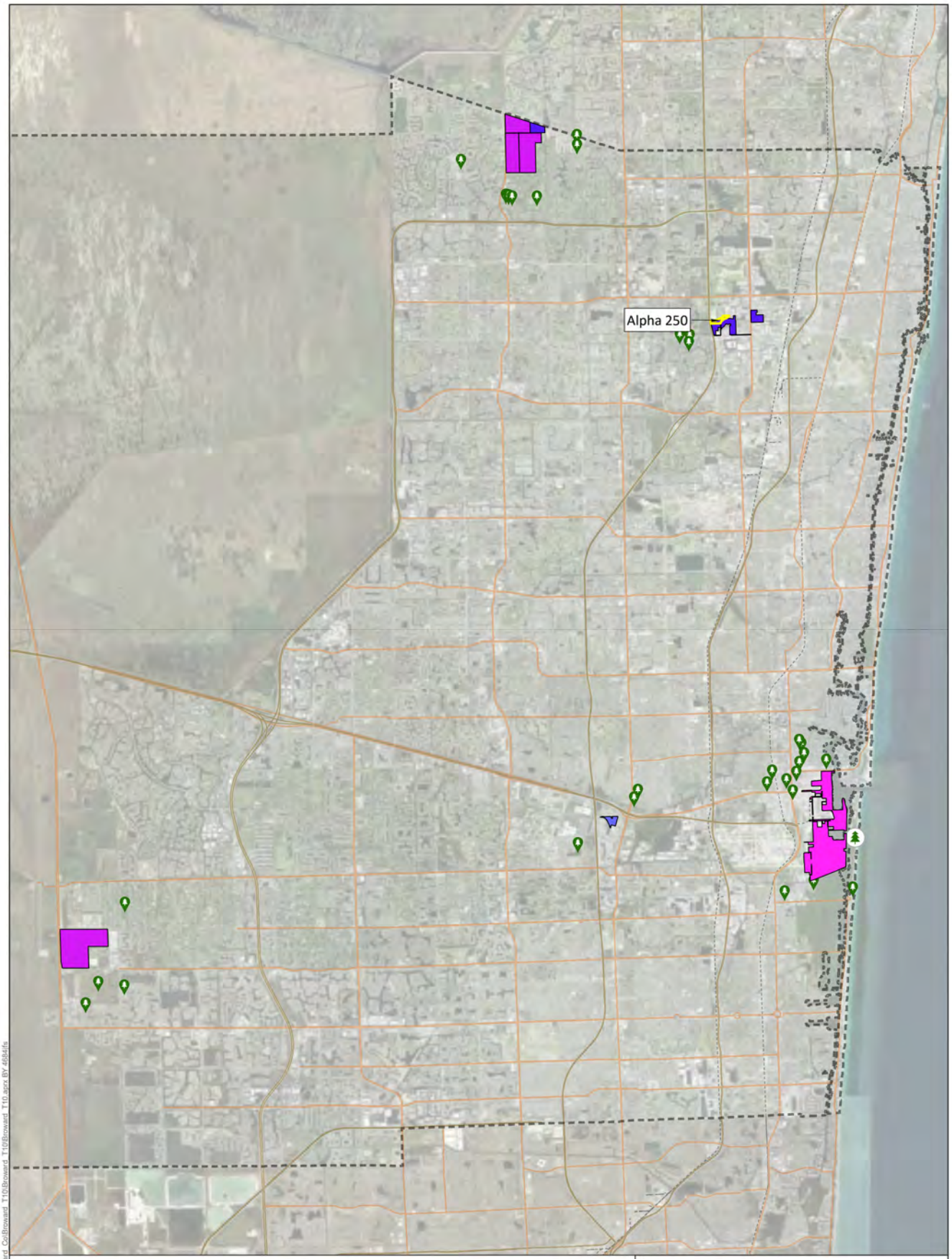
Parcels Suitable for Biochar and Nearby Natural Areas

Broward County

Figure 1 | **Feb 2025**

SCS ENGINEERS

State of Florida, Earthstar Geographics



Legend

Suitable Parcels

Acreage

- 30-40 acres
- 40-75 acres
- 100-1,000 acres
- > 1,000 acres

Natural Areas within Mile of Suitable Parcels

- Broward County State Parks
- Broward County City Parks CD
- County Boundary

N W E S

0 1 2 Miles

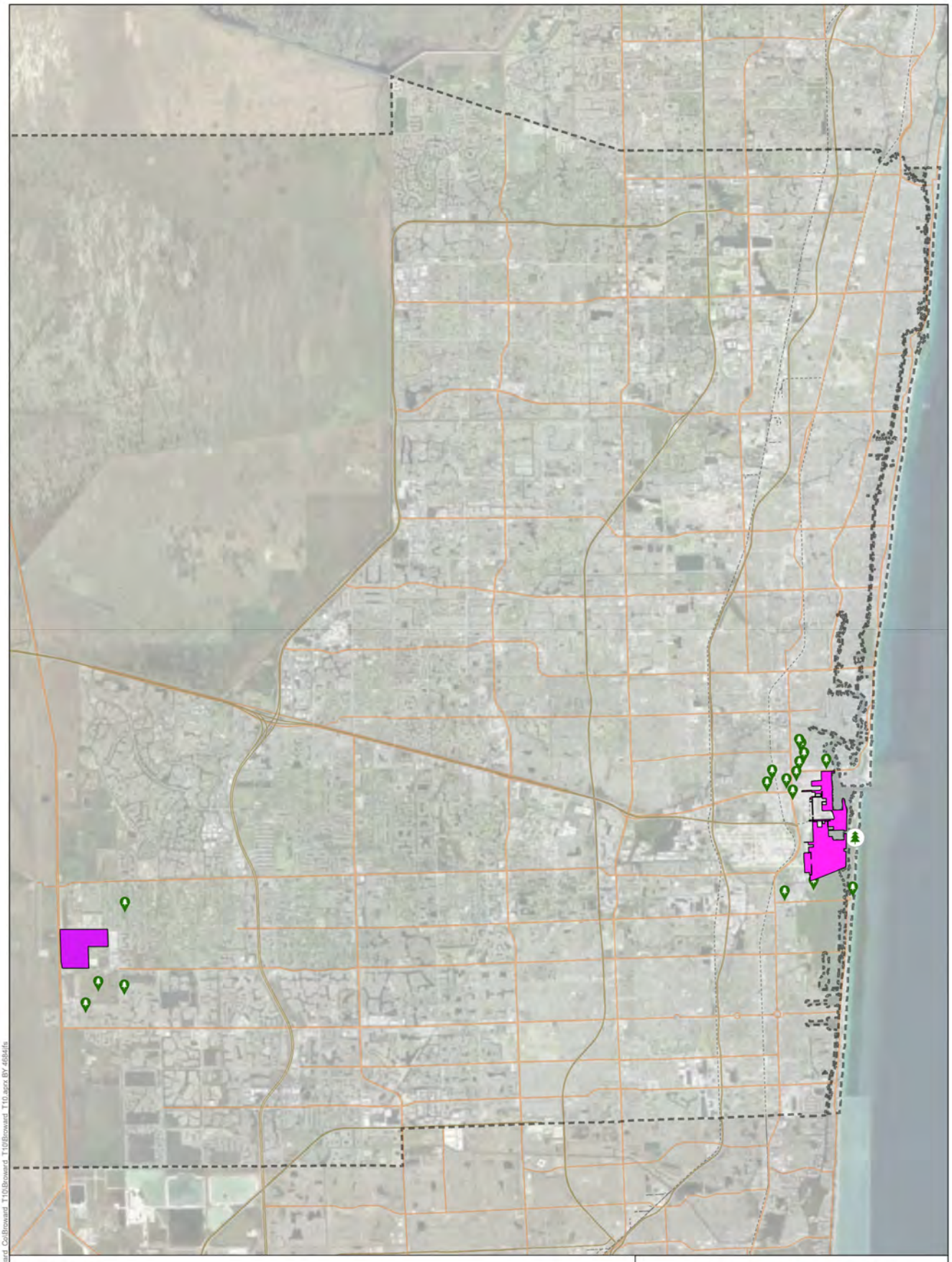
Parcels Suitable for C&D Recycling and Nearby Natural Areas

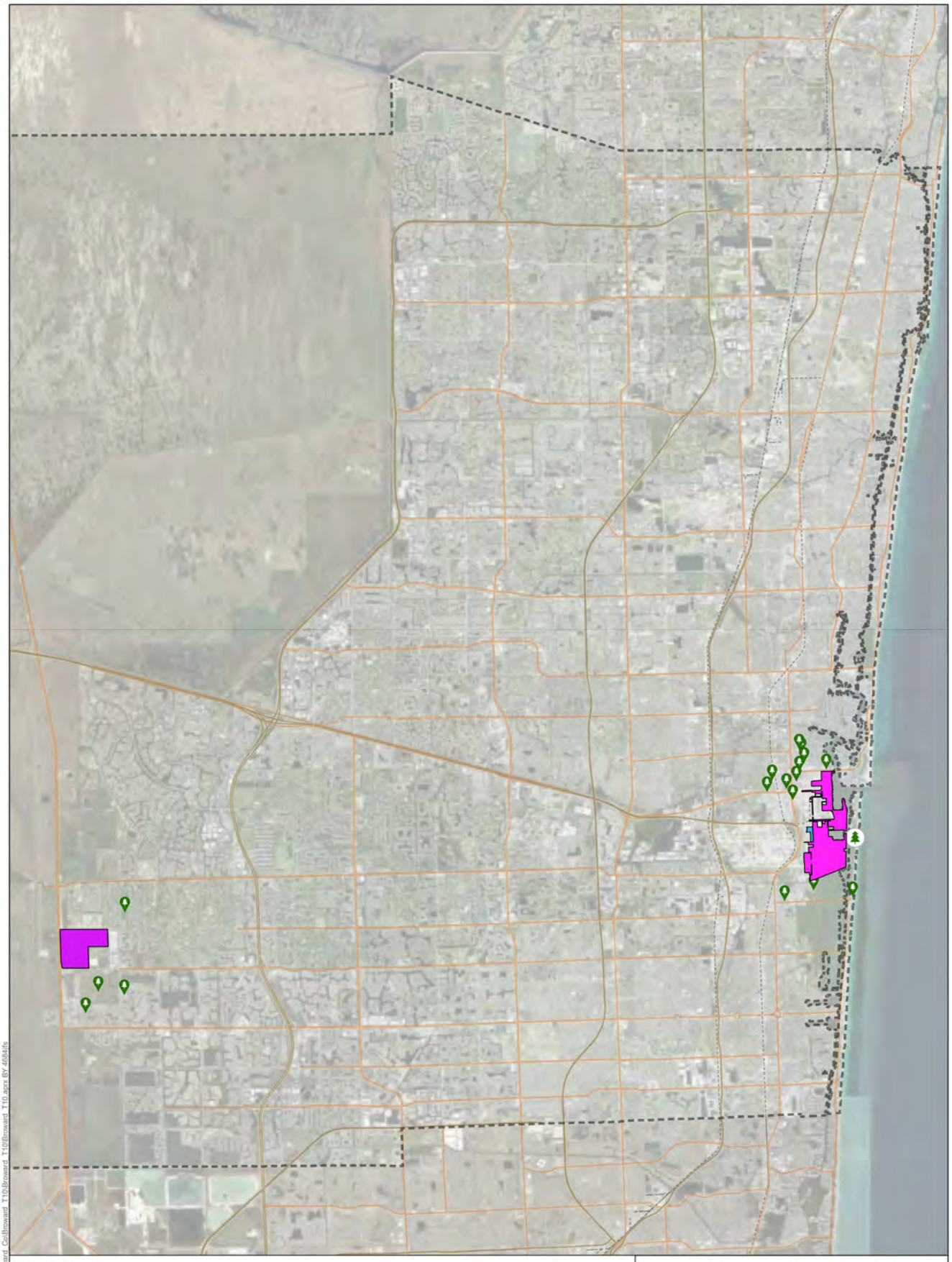
Broward County

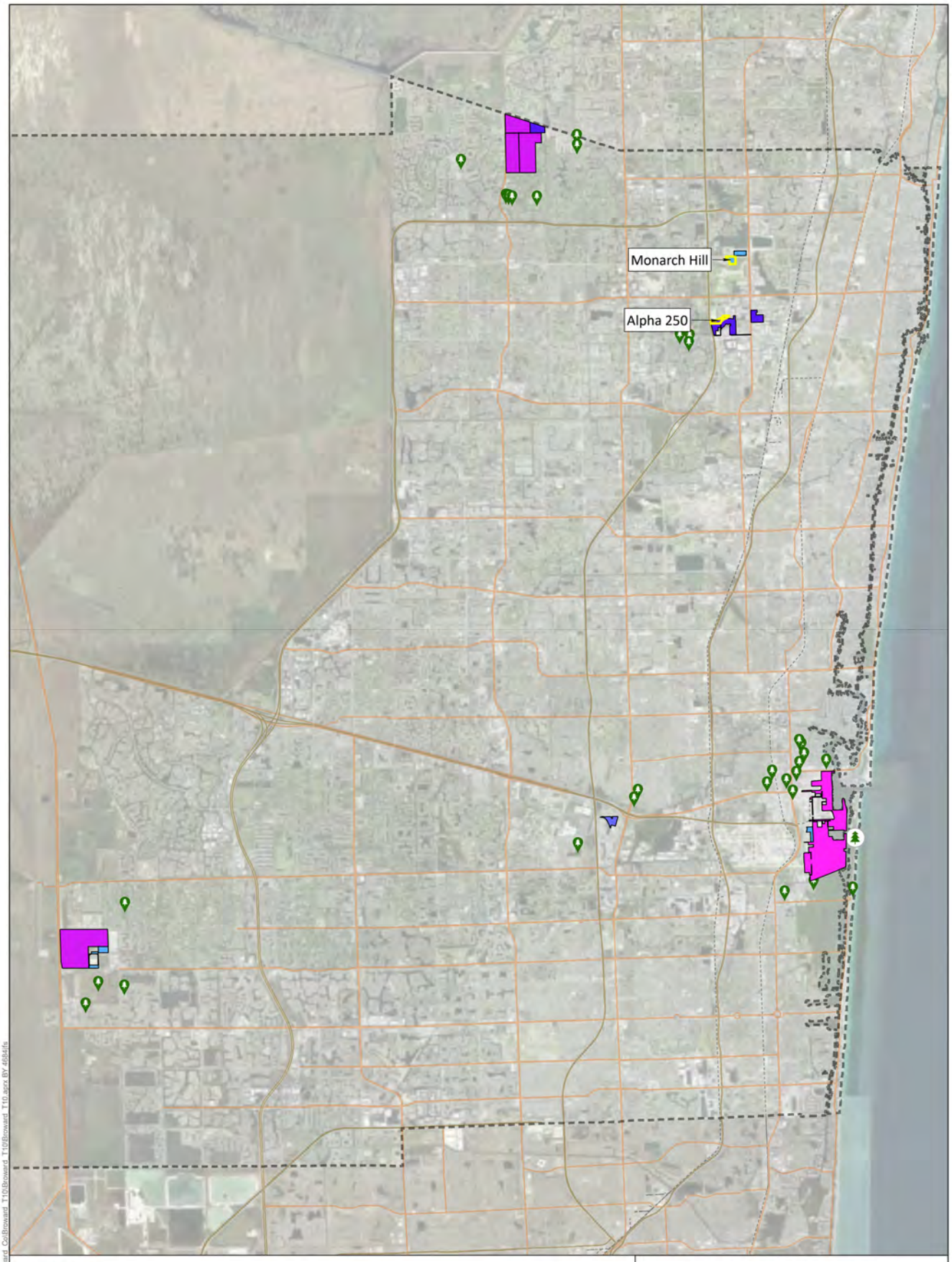
Figure 2 | **Feb 2025**

SCS ENGINEERS

State of Florida, Earthstar Geographics


Legend
Suitable Parcels
Acreage
100-1,000 acres
> 1,000 acres
Natural Areas within Mile of Suitable Parcels
Broward County State Parks
Broward County City Parks
CASP
County Boundary
N
W
E
S
0 1 2
Miles
Parcels Suitable for CASP and Nearby Natural Areas
Broward County
Figure 3
Feb 2025
SCS ENGINEERS
State of Florida, Earthstar Geographics


Legend
Suitable Parcels
Acreage
20-30 acres
100-1,000 acres
> 1,000 acres
Natural Areas within Mile of Suitable Parcels
Broward County State Parks
Broward County City Parks MWP+AD
County Boundary
N
W
E
S
0 1 2
Miles
Parcels Suitable for MWP+AD and Nearby Natural Areas
Broward County
Figure 4
Feb 2025
SCS ENGINEERS
State of Florida, Earthstar Geographics



Legend

Suitable Parcels

Acreage

- 20-30 acres
- 30-40 acres
- 40-75 acres
- 100-1,000 acres
- > 1,000 acres

Natural Areas within Mile of Suitable Parcels

- Broward County State Parks
- Broward County City Parks MRF500K
- County Boundary

N W E S

0 1 2 Miles

Parcels Suitable for MRF (150K TPY) and Nearby Natural Areas

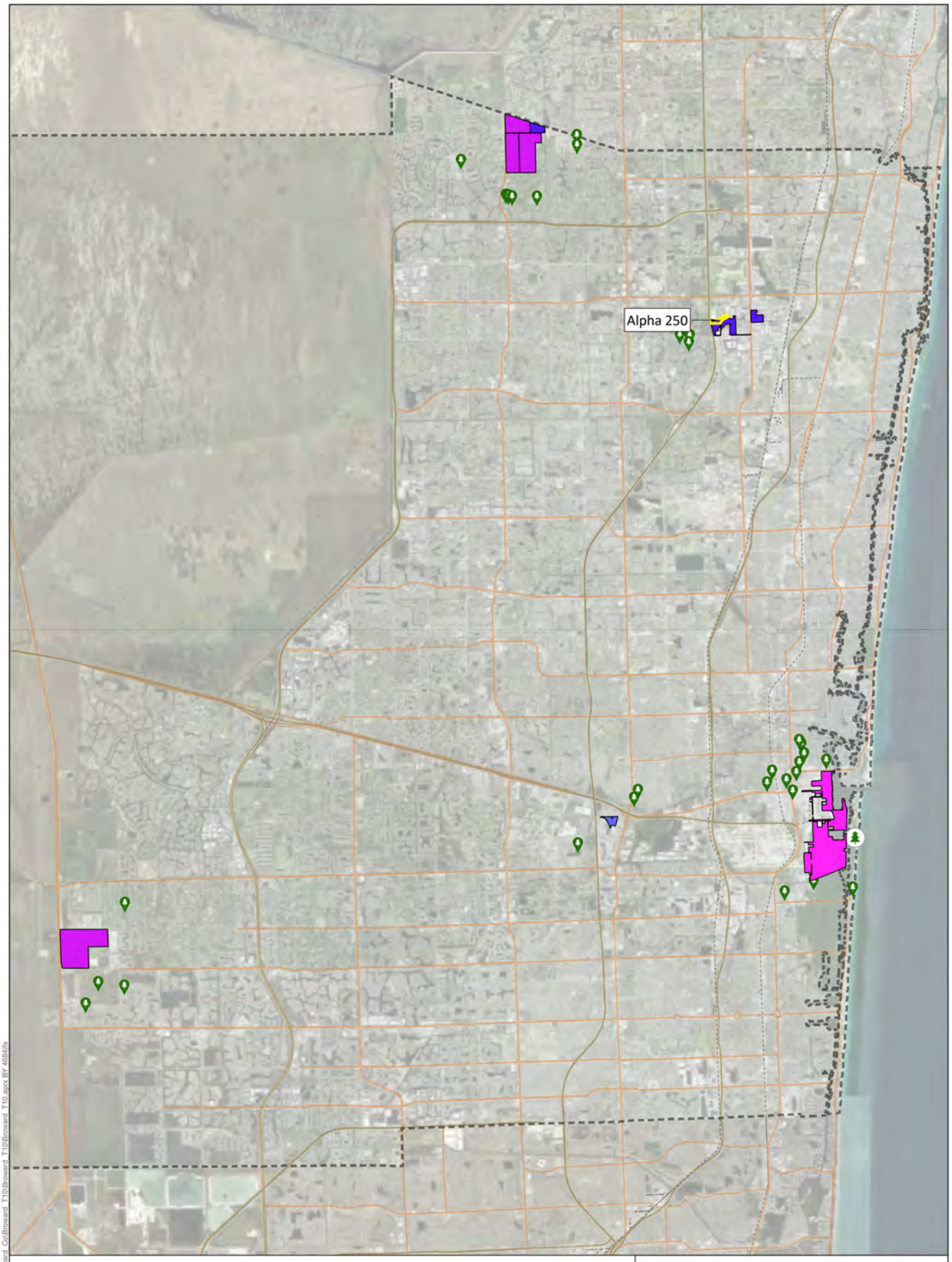
Broward County

Figure 5 | **Feb 2025**

SCS ENGINEERS

C:\Users\46584fs\OneDrive - SCS Engineers\Desktop\GIS\Broward_Co\Broward_T10\Broward_T10.aprx BY 46584fs

State of Florida, Earthstar Geographics



Legend

Suitable Parcels

Acreage

- 30-40 acres
- 40-75 acres
- 100-1,000 acres
- > 1,000 acres

Natural Areas within Mile of Suitable Parcels

- Broward County State Parks
- Broward County City Parks MRF500K
- County Boundary

N W E S

0 1 2 Miles

Parcels Suitable for MRF (500K TPY) and Nearby Natural Areas

Broward County

Figure 6	Feb 2025

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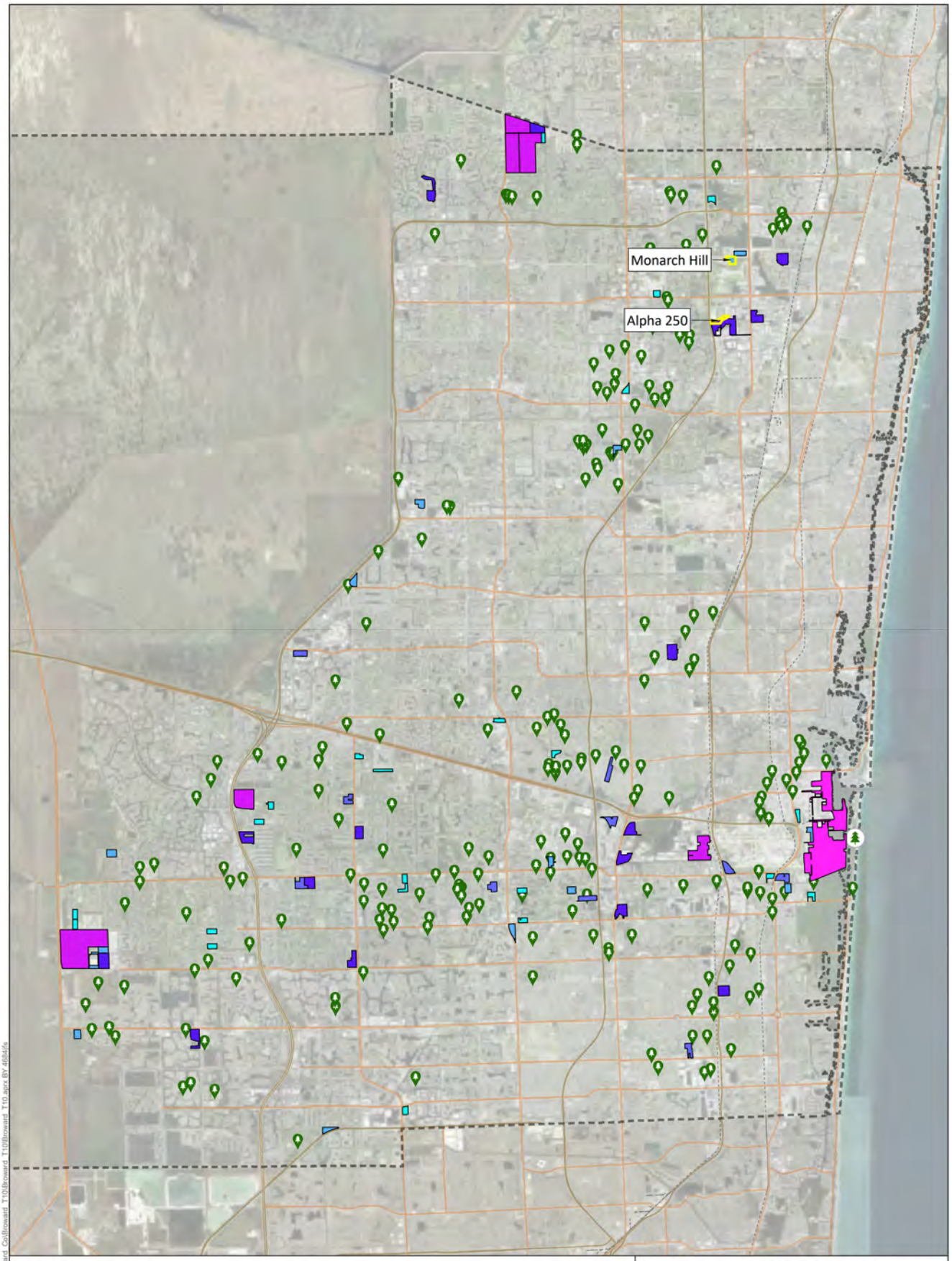
State of Florida, Earthstar Geographics



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Suitable Parcels

Acreage

- ≤ 20 acres
- 20-30 acres
- 30-40 acres
- 40-75 acres
- 100-1,000 acres
- > 1,000 acres

Natural Areas within Mile of Suitable Parcels

- Broward County State Parks
- Broward County City Parks TS
- County Boundary

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Parcels Suitable for Transfer Station and Nearby Natural Areas

Broward County

Figure 7 | **Feb 2025**

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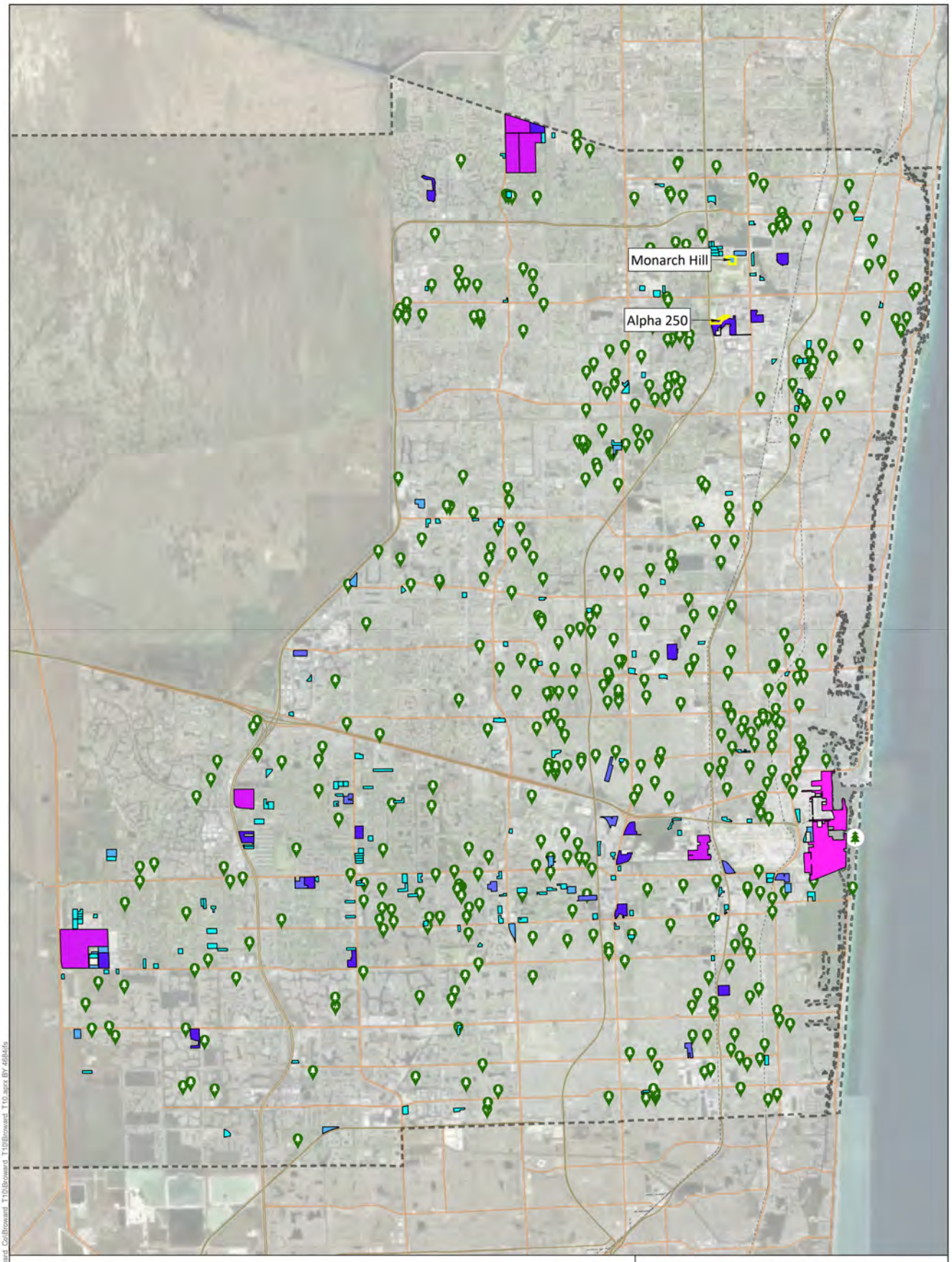

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- 100-1,000 acres
- > 1,000 acres

Natural Areas within Mile of Suitable Parcels

- Broward County State Parks
- Broward County City Parks
- County Boundary

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State of Florida, Earthstar Geographics

Parcels Suitable for Dropoff Facility and Nearby Natural Areas

Broward County

Figure 8 | **Feb 2025**

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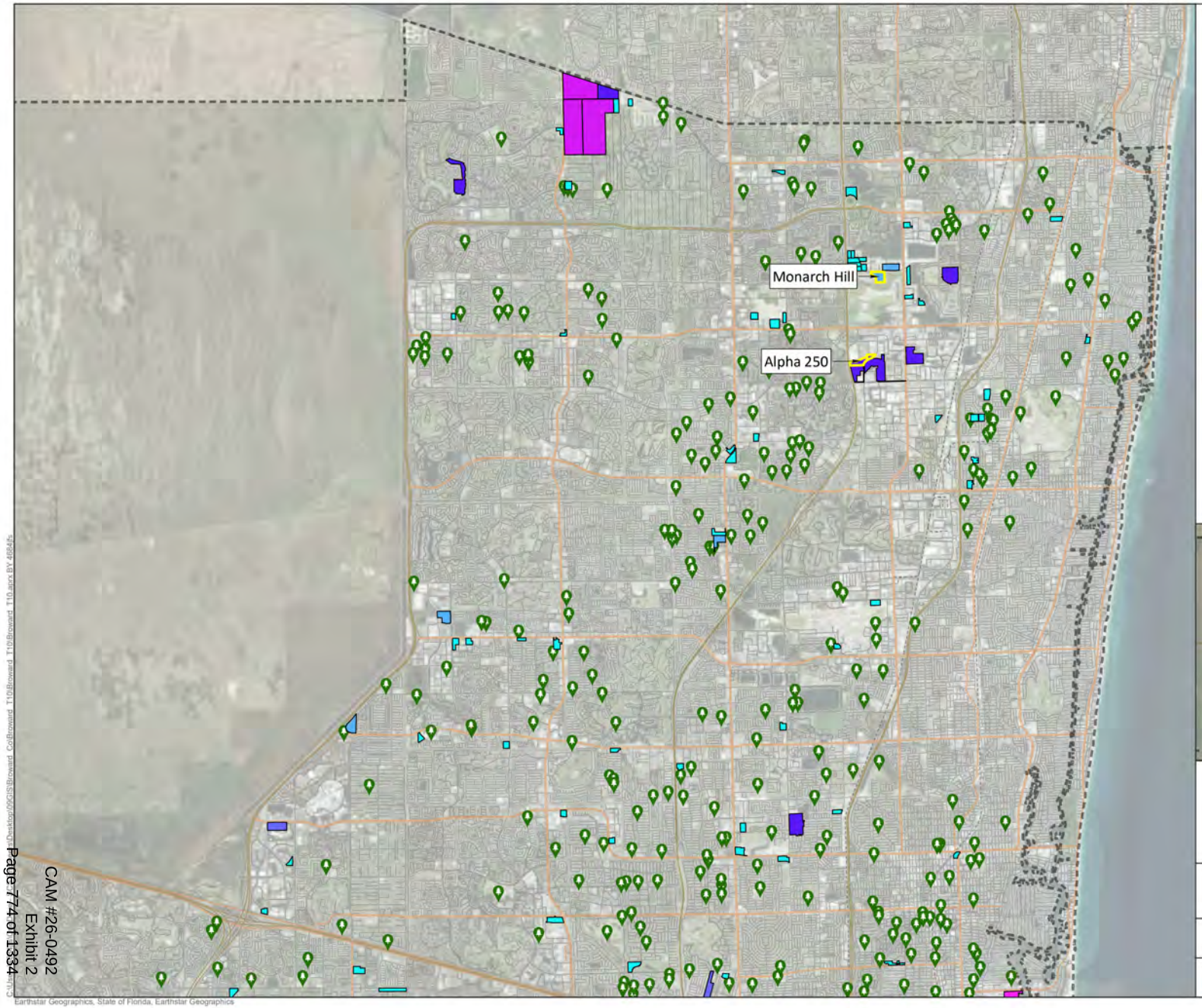

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Suitable Parcels

Acreage

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- 40-75 acres
- 100-1,000 acres
- > 1,000 acres

Natural Areas within Mile of Suitable Parcels

- Broward County State Parks
- Broward County City Parks
- County Boundary

Parcels Suitable for Dropoff Facility and Nearby Natural Areas

Broward County

Figure 9	Feb 2025

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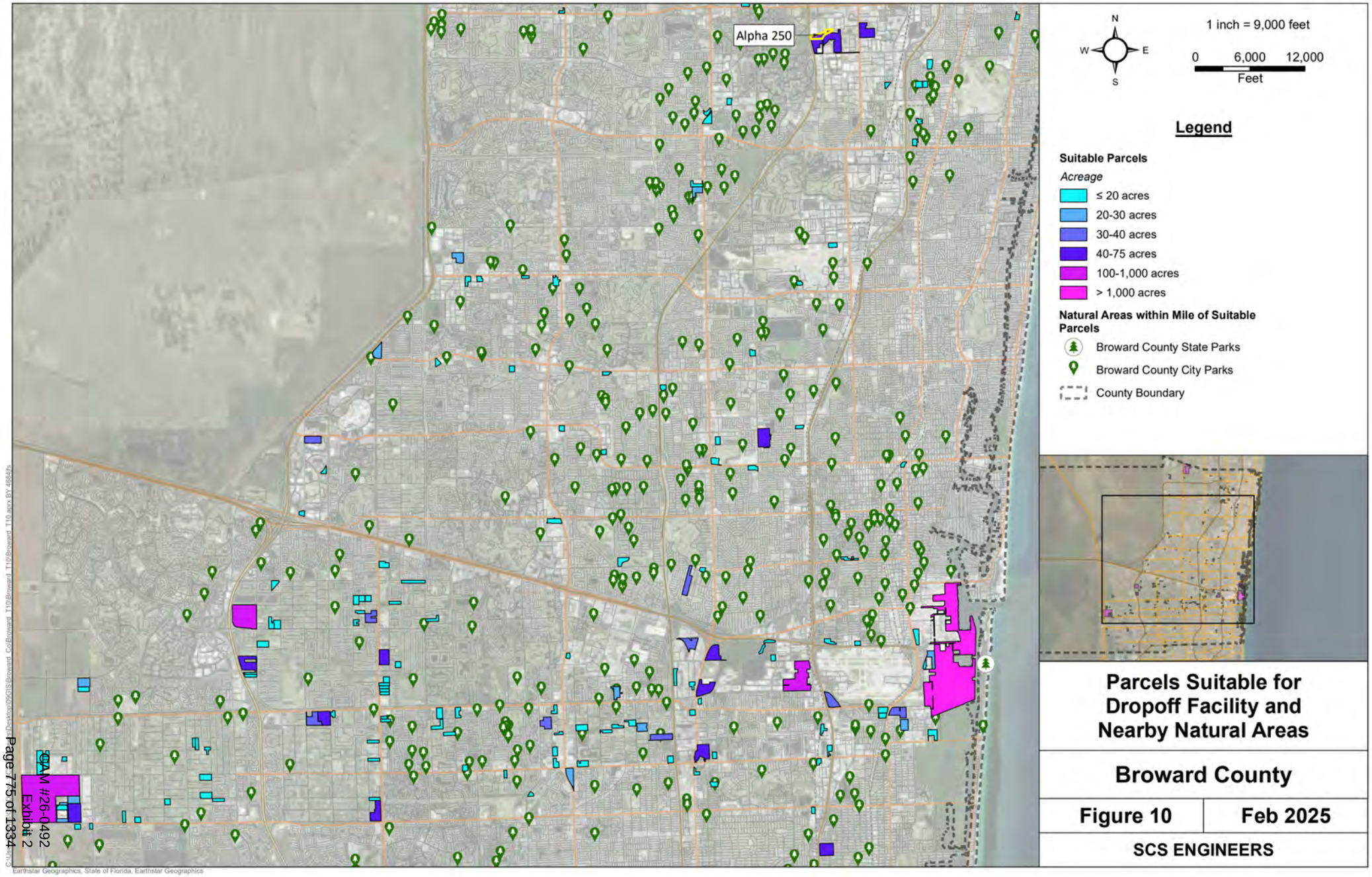
Earthstar Geographics, State of Florida, Earthstar Geographics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Natural Areas within Mile of Suitable Parcels
Broward County State Parks
Broward County City Parks
County Boundary
Parcels Suitable for Dropoff Facility and Nearby Natural Areas
Broward County
Figure 10
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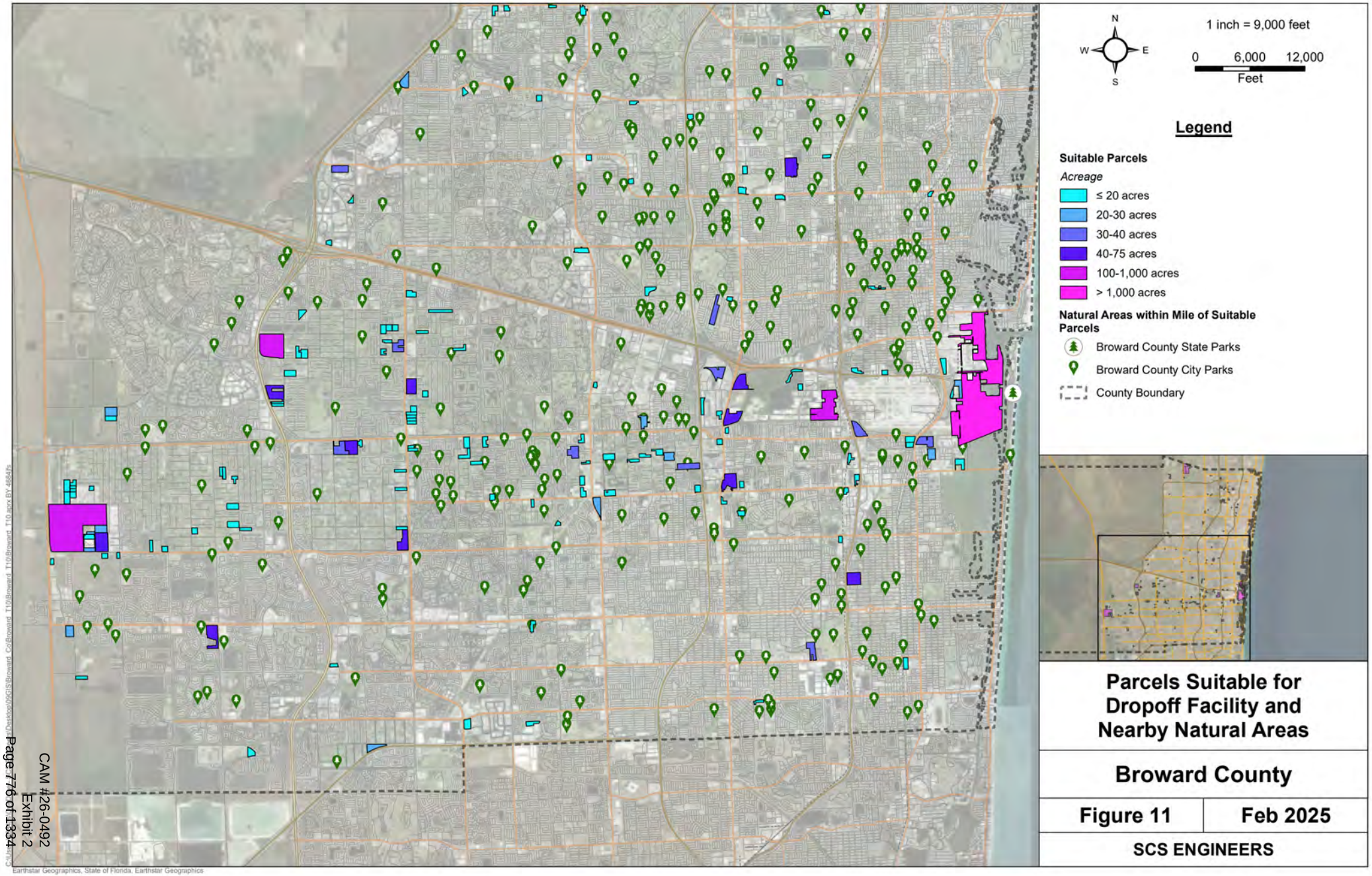
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County Boundary
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Broward County
Figure 11
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Appendix M

Task 9 White Paper – Innovative and Future Technologies

Solid Waste Authority of Broward County

TASK 9 - Innovative and Future Technologies White Paper

Solid Waste Disposal and Recyclable Materials
Processing Authority of Broward County, Florida
115 South Andrews Avenue, Room 122
Fort Lauderdale, FL 33301
786 626-1217

SCS ENGINEERS

09224106.00, Task 00009 | January 16, 2025

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1.0 INTRODUCTION

Effective materials management is at the heart of sustainable and resilient waste systems with lowest emissions and highest recovery. The Solid Waste Authority of Broward County (Authority) faces increasing waste generation, shifting consumption patterns, staffing issues, and intensifying environmental challenges, necessitating innovative solutions that enhance efficiency, reduce costs, and foster environmental stewardship.

This white paper explores the cutting-edge advancements in materials management, including the integration of artificial intelligence (AI) with all facets of the solid waste system supply chain, encompassing collection vehicles and systems, materials sorting technologies, landfill management including the use of solar photovoltaic systems on closed sites , emerging battery management practices, e-waste recovery systems, textile recovery optimization, and impacts associated with per- and polyfluoroalkyl substances (PFAS). It also examines advanced recovery methods for gases, ash outputs, biological digestion, and the beneficial reuse of process residues. These quickly evolving practices are transforming waste management, making it safer and efficient, increasing recovery rates, and reducing environmental impacts.

The SCS Team utilized deep and practical expertise in state-of-the-art equipment and systems, both hardware and software, and in solid waste and recovery methods and facilities to build this compendium and identify the latest emerging supply chain technologies for collection, sorting, recycling, and disposal. Where possible, the authors also used this expertise to analyze facility footprints and equipment, estimating capital expenses, and cost-per-ton ranges, and scalability. In addition, assessments of processing facilities include proof points for meeting local Authority requirements, recovery outputs, emissions ranges, automation potential, staffing needs, and other impacts.

Some key takeaways from this broad survey are especially important for the long term:

- Connectivity for all assets and players using the revolution being quickly implemented by solid waste managers through Web 3.0 (which provides premier tools, artificial intelligence, and blockchain technology) and the internet of things (IoT) is recommended immediately and through the planning horizon because it will be required to keep costs down and improve service in a rapidly growing and crowded County. The options presented are a small representation of the amazing number of choices the authority needs to make in the next five years. In addition, it is recommended the Authority maintain a strong and prioritized focus on compatibility and connectivity as part of knitting together the high diversion solid waste system it envisions in the future. Harmonization will also be required for both customer services (e.g., collection pick up types) across the Authority member municipalities, as well as data integration, with the latter requiring uniform programming, metrics, and information flow for best connectivity and maximum system improvement to work.
- A few newer 21st century versions of proven technologies are seeing the biggest gains in recovery of mixed waste and will be needed to get to the 75% diversion goal in Florida. These include the following:
    1. Backend organics solutions after capturing recyclables from the flow, which have shown operational resilience and the biggest jump in diversion as their use has expanded from in-vessel, aerobic or other compost methods to wet anaerobic digestion (AD).

2. Automation of dangerous and repetitive manual sorting jobs exposed to the mixed waste flows in a processing facility. New automated sorting protocols and devices have shown to increase recyclables captured, especially AI-assisted banks of optical sorters and air classification devices.
3. AI-assisted recirculation and sorting redundancy, a practice gaining steam in all waste sorting plants including single stream, to enrich mixed waste facility processing flows; thereby automatically capturing more recyclables that were previously missed and doing it better than manual sorting.
4. Conversely, the more capital and energy intensive technologies, including large-scale pyrolysis/gasification/hot hydrolysis/RDF thermal diversion, have had several failures and no sustained successes in North America, and they only seem to be sustained in highly regulated geographies with high landfill fees.

- More generally, the rapid, unprecedented rise of solid waste autonomous processes, which are now available or less than five years away, is all fueled by the new connectivity. From landfill life management to litter identification and abatement, to monitoring scales or even monitoring the entire solid waste collection service in real time, to the certain future use autonomous vehicles for some types of solid waste collection (just to name a few), these autonomous processes are transforming the way we think and manage waste; leading to lower costs, better safety, higher diversion, and less daily disruptions.

Through this compendium, tailored to the Authority's unique context, stakeholders will gain actionable options for solid waste collection, processing, recovery, and disposal. By leveraging these technologies, the Authority can establish a future-ready, sustainable materials management strategy aligned with its environmental and operational goals.

2.0 COLLECTION SYSTEMS INNOVATION & TECHNOLOGY

2.1 ALTERNATIVE FUEL COLLECTION VEHICLES

The solid waste collection vehicle landscape is shifting as the industry adopts alternative fuel collection vehicles to replace the traditional use of diesel fuel to meet the market demand for more sustainable solid waste management practices and improved operational effectiveness, including reduced emissions and smart fleet management.

2.1.1 Compressed Natural Gas/Renewable Natural Gas Collection Vehicles

Many solid waste collection vehicle fleets throughout the United States have transitioned to compressed natural gas (CNG) as a fuel source. This transition has helped both offset a company's carbon footprint and fleet maintenance costs. With CNG being the first step in a cleaner operating vehicle, many major manufactures offer a CNG fueled vehicle straight from the factory. However, cost remains a factor in upgrading a fleet to CNG by either buying a new CNG truck, which costs more than a diesel, or retrofitting an existing diesel fleet to CNG. The other cost factor that needs to be addressed is fueling. CNG, in the long run, is cheaper than diesel, but putting in a CNG fueling infrastructure is a major upfront cost to fuel a fleet.

Some solid waste collection companies are starting to explore using renewable natural gas (RNG) to fuel their CNG fleets. Companies that operate both collection vehicle fleets and landfills are now using the methane that landfills produce to fuel CNG fleets. Using RNG helps reduce one's carbon footprint even more. However, the major consideration with this option is the major up-front cost needed to construct an RNG facility at a landfill.

2.1.2 Electric Collection Vehicles

Electric solid waste collection vehicles are coming down the pike. Several fleets have been testing the use of electric trucks within their existing fleet. Unlike diesel or CNG, a large portion of the truck weight is going to be the battery to power the truck. Thus, creating a major drawback limiting the range that current battery powered trucks offer. Several major manufactures are now offering electric trucks as a production vehicle. The trucks themselves cost much more than a diesel- or CNG-powered truck, making fleet conversion a slower process. Also, like all other alternative fuel types, there is a large upfront cost to build the infrastructure to charge the fleet at headquarters and for the emergency charging capabilities that are needed to take into the field. With refueling electric trucks, time is going to be a factor when recharging these trucks.

2.1.3 Hydrogen Fuel Cell Collection Vehicles

Solid waste collection vehicles that operate on a hydrogen fuel cell are still in their infancy within the United States. Only one (1) company currently manufactures a hydrogen fuel truck in the United States. In other parts of the world, hydrogen collection vehicles are used to collect waste. Hydrogen fuel production isn't widespread in the United States, thus limiting the area that these collection vehicles can operate. Notably, hydrogen-fueled collection vehicles have a greater operating range than electric collection vehicles. Hydrogen-fueled collection vehicles also offer a fleet to have zero-tailpipe emissions when operating. Like CNG and electric trucks, a major upfront cost is going to be building a refueling infrastructure to supply a fleet with fuel.

2.2 THE NEW CONNECTED MONITORING AND SENSOR SYSTEM AND SOLID WASTE MANAGEMENT (WEB 3.0 AND IOT)

2.2.1 Solid Waste Management Technology: A Transformational Shift

Two major technological trends are revolutionizing solid waste management by seamlessly connecting system actors, local monitoring devices, and daily processes in unprecedented ways.

2.2.1.1 Web 3.0 Technologies

Web 3.0 represents an evolving infrastructure that integrates smart, connected applications across users, devices, the cloud, and edge computing specific to solid waste systems. This interconnected or "internet" leverages real-time inputs from all system components to deliver consistent and reliable data, enabling automatic and rapid adjustments that enhance efficiency and reduce costs. As the foundation for advancements in artificial intelligence (AI), blockchain technologies, and 3D graphics, Web 3.0 aims to decentralize systems while ensuring safer, self-regulated transactions. In the solid waste industry, Web 3.0 infrastructure adapts dynamically to predictable waste management practices, optimizing processes, and fostering innovation.

2.2.1.2 Internet of Things (IoT)

The IoT facilitates centralized control over diverse components of the solid waste system through internet connectivity. This includes real-time communication across stakeholders—customers, supervisors, municipal personnel, facility managers, third-party contractors, drivers, salespeople, etc.—and integration with devices such as on-board computing truck driving pattern recorders, smart phones, scales, monitoring cameras, sensors for heat and gas detection, truck and facility computerized maintenance management systems (CMMS), public emergency management systems, etc. These IoT-enabled technologies create a cohesive and intelligent feedback loop from these disparate devices that surpasses manual management of predictable events, forming a secure data-driven network to enhance safety, efficiency, and automation across all facets of waste operations.

2.2.1.3 Innovative Tools Driving Transformation

By leveraging Web 3.0 tools like blockchain for secure transactions and AI for real-time decision-making, solid waste management processes have become more responsive to industry challenges. Low power connected devices are being deployed across supply chains, fundamentally altering system operations. Edge devices—such as locators, sensors, and data aggregators—enable comprehensive monitoring of diverse activities, from collection system operations to machine performance, to environmental outputs. These devices can even detect critical intervention needs and, in some cases, initiate corrective actions autonomously.

Emerging platforms and applications now monitor and manage key assets and systems, including fleet vehicles, landfill capacity, air pollution controls, gas detection systems, and route optimization. These tools facilitate real-time communication between field devices, central computers, and mobile applications, empowering managers to address deviations promptly.

2.2.1.4 Capabilities Enabled by Smart Waste Technologies

Real-time outputs from smart waste systems now deliver actionable insights, such as:

- Reminding maintenance teams of scheduled upkeep and alerting them to repair needs.
- Adjusting collection schedules based on service demands.
- Analyzing changes in waste streams, including weight and soon, composition.
- Diagnosing preventative maintenance requirements for equipment.
- Notifying key personnel of abnormalities or urgent issues in the system.

The integration of "machine-to-machine-to-decision-maker" communication, underpinned by AI and IoT, is driving unparalleled efficiency in solid waste management. Staying informed about advancements in this infrastructure is essential for long-term planning and should be incorporated into procurement processes to ensure sustainable and effective operations.

2.3 ARTIFICIAL INTELLIGENCE (AI) FOR SOLID WASTE COLLECTION

2.3.1 Introduction

Artificial intelligence (AI) is transforming municipal and commercial solid waste systems by leveraging machine learning, data analytics, and predictive modeling to enhance operational efficiency and decision-making. AI-assisted technologies are increasingly employed to address key challenges and optimize performance in the following areas:

- **Optimizing Resource Allocation:** AI enables the development of efficient waste collection routes, reducing fuel consumption and labor costs.
- **Automating Repetitive Tasks:** By automating dangerous and repetitive manual processes, AI reduces workplace injuries and addresses high turnover rates.
- **Predicting Waste Generation Patterns:** AI can analyze and predict household and commercial waste generation rates by geographic or industry classification, aiding in capacity planning and resource deployment.
- **Dynamic System Responses:** Real-time data and AI-powered responses enable systems to adapt to changing waste compositions, improving diversion rates and material recovery efficiency.
- **Enhancing Supervision and Productivity:** AI-driven real-time location mapping improves oversight and productivity of collection services.
- **Resolving Disruptions:** Automated monitoring helps identify and resolve service disruptions, ensuring timely customer service and minimizing inefficiencies.

2.3.2 Addressing Specific Operational Challenges

AI is particularly well-suited for addressing persistent inefficiencies in waste collection systems, such as in the following ways:

- **Container Monitoring:** Overfilled or underutilized collection containers increase collection times. AI systems can monitor fill levels in real time, enabling more efficient container use.
- **Predicting Service Demands:** Socioeconomic changes often alter waste generation patterns. AI can forecast future needs based on demographic and economic trends, allowing systems to adjust proactively.
- **Driver Risk Profiles:** Driver behavior affects service reliability. AI can analyze driving patterns to detect risks, reducing accidents, missed pickups, and service disruptions.
- **Recyclable Composition Analysis:** The dynamic nature of recyclable material streams requires constant updates. AI-powered image recognition, combined with extensive databases, offers real-time composition analysis at a fraction of the cost of traditional waste studies.
- **Infrastructure Planning:** AI demand forecasting models can predict long-term capacity needs for disposal and processing facilities, replacing costly and time-intensive studies.

2.3.3 Strategic Integration of AI

The integration of AI into solid waste management systems is advancing rapidly, and the next three to four decades will see unprecedented adoption of these technologies. To maximize the benefits and minimize start-up costs, the following strategic steps are recommended:

1. **Standardizing Service Offerings:** Harmonize current collection, processing, and disposal approaches across the Authority to enable effective implementation of AI tools by making the Web 3.0 connectable and developing the local solid waste system IoT.
2. **Prioritizing Data Integration:** Ensure comprehensive and accurate data collection by aggregating diverse inputs from sensors, scales, recorders, and other technologies. Coordination across municipalities and private contractors will be critical.

2.3.4 Overcoming Data Bottlenecks

Effective AI deployment depends on robust data integration. The Authority must address challenges associated with aggregating diverse datasets, including real-time operational data and historical records. Standardizing service offerings, metrics, and parameters will ensure that AI systems deliver actionable insights, reduce lead times, and minimize costs.

When implemented correctly, AI-driven systems can significantly enhance efficiency, public satisfaction, and cost-effectiveness. They also provide critical oversight for contracted services, helping to maintain competitive service rates while achieving high levels of operational performance.

2.3.5 Key AI Innovations to Consider

Several emerging AI technologies and technology solutions are poised to revolutionize solid waste management. These innovations should be evaluated by the Authority for their potential to streamline operations and improve outcomes.

Table 1 presents key AI innovations by category and function, including on-board, connected computing in collection and transfer vehicles, which are being universally adopted:

Table 1. Key AI Innovations

CATEGORY	FUNCTIONS
Smart Bin Systems include public place disposal, litter, and recycling access points and commercial receptacles used in conventional collection, i.e., roll-off and compactor systems, Front End Loader yardage containers, automated curbside cart systems, and integrated bin/compactor public venue systems are also included. • Types of smart bin technologies: o Low Power Wide Area network (LPWAN) and message cueing telemetry transport systems (utilizing a broker) can send signals and data long distances while consuming low power. o Bluetooth systems can send signals to a nearby hub or worker. o GSM Global mobile communication allows bins to send signals and data to each other and hubs at fast rates of speed.	• Optimizes collection through real-time monitoring of levels of waste within different container types. Sends a signal when containers are full for automatic collection scheduling. • Can bill customers automatically when containers are overfilled, and/or itemize services delivered, i.e., for each collection. • Identifies types of materials collected, i.e., information on volumes, mass, and composition (the latter, just now hitting the market).
Route and System Optimization Systems monitor route, stop, and disposal travel times. They also unload and cue times, fuel consumption, and service disruptions, and provide useful feedback to enhance productivity.	Data sets (e.g., historical and daily traffic patterns and conditions), collection data (e.g., fuel consumption per day and driver), GPS tracking, and weather forecasts are used to adjust routes.
Dynamic Scheduling Systems adapt to changing waste generation patterns and allocate productivity changes in solid waste service systems, routes, hours of operation, and times.	• Allows optimal planning and adjustment of waste service schedules based on real-time data. • Longer term, targeting, and availability of waste services will become adaptive and more powerful through continuously analyzing these data sets along with current and historical traffic conditions on Broward County's crowded road systems, weather forecasts, and population density.
Demand Prediction Technology updates planning systems for future service coverage and the need/placement of hub and spoke solid waste facilities for further processing and/or disposal by using various data sources and algorithms. Also incorporates data from sources such as social media, online platforms, etc.	• AI analyzes collected data sets and makes accurate predictions considering demographic factors, waste generation rates, spike events, and holidays to forecast waste generation. • Technology is used to plan for efficient hub and spoke transfer station, processing, and disposal facilities.

CATEGORY	FUNCTIONS
On-Board Computing/Monitors fixed, 'connected' devices installed in the cabs of collection vehicles which show where drivers/vehicles are physically located, assigns work (missed collection point), and collects the service history of the vehicle and driver. Most importantly, it is tied into fleet maintenance hardware which can tell technicians when and what services and repairs must be made based on vehicle behavior, mileage, or incident.	• Produces daily metrics for each driver, pick up, and route. • Produces historical activity and route records. • Can prepare customers for arrival time and answer questions on historical or yet to be performed services. • Can alter route coordinates and pick up points in real time for reacting to traffic or workload anomalies. • Can start the billing processes for completed services automatically by sending service completion signals to accounts receivable through the portal.

The leading national private waste management companies are rapidly adopting these advanced systems, including other AI-driven tools, to optimize resources, streamline logistics, and enhance scheduling efficiency. These companies have heavily invested in centralized, interactive data portals to manage customer and operational processes, leveraging AI to identify trends and insights that improve both service quality and financial performance.

Additionally, they are integrating smart applications on customer devices, such as home computers and smartphones, featuring multilingual capabilities and other user-centric tools. These apps feed data into AI systems, enabling continuous learning and adaptation to user behavior, which enhances operational management and customer feedback.

To ensure alignment with industry advancements, this plan recommends that future procurement activities by the Authority prioritize service providers with demonstrated capabilities to integrate AI technologies. Providers should be evaluated based on their ability to adapt AI tools over contract periods and their capacity to grant the Authority access to collection and processing data through AI-enhanced platforms. This approach will enable the Authority to monitor system-wide operations effectively and leverage data for informed decision-making.

2.3.6 Collection System Tools

2.3.6.1 Interactive Community and/or Authority-wide Waste Services Portal

One of the most promising advancements in solid waste management technology is the rapid development of comprehensive municipal waste enterprise software suites, often referred to as "portals," which are increasingly incorporating AI and machine learning capabilities by utilizing Web 3.0 connectiveness. These platforms integrate customer and management tools via desktop and mobile applications, creating a seamless connection to the central portal.

These systems automate and digitize customer-facing processes while providing real-time feedback loops for scheduling, notifications, and service monitoring. Besides on-board computing, other devices in key points in the supply chain also have critical features, which include the following:

- Productivity monitoring (scales, pre-trip handheld checklist devices, maintenance and shop productivity)
- Real-time updates on service delays and disruptions (public service announcement platforms, community information relay)
- Scheduling of additional or specialized services (customer smart phones, route manager tablet)
- Notifications for service delivery and adherence to service parameters (customer smart phones, route manager tablet)
- Automated monitoring of service quality and payment processing customer smart phones, route manager tablet)
- Instant cost assessments (customer smart phones, route manager tablet)
- Payment and invoice notifications (customer smart phones)

The overarching goal of these platforms is to unify system data and processes into a single, cohesive framework, enhancing efficiency and value. Over the planning horizon, AI-driven portal platforms are expected to play a critical role in managing the complexities of system inputs and outputs. They will leverage features like multilingual support to effectively serve diverse customer communities such as Broward.

Table 2 presents enterprise-wide technology platforms and applications, which are set to deliver advanced functionalities across a wide range of categories.

Table 2. Enterprise-wide Technology Platforms and Applications

CATEGORY	FUNCTIONALITY
Customer Waste Behavior Monitoring	Monitors set outs, participation, contamination in recycling bins, litter at bin sites, volume/weight limit reporting, enforcement events, etc. Phone and computer apps send reports, notifications, and other feedback to the actors in the system (customers, private service providers, and system managers). The collected behavior data and outcomes can perform the following: Signals for pick-up of full bins. Send notifications, warnings, suspensions of service for abuse, contamination, litter, or non-payment.

CATEGORY	FUNCTIONALITY
	Can bill automatically when containers are overfilled, and/or itemize services delivered (i.e., for each collection). Also, can bill additional charges (e.g., pay as you throw volume limits exceedance). Collection periodicity sums the amount of collection signals and how full the containers are from the stop.
Notification Systems for efficient delivery of services and customer behavior modification. Streamlined notification system that will drive higher and proper levels of participation in programs	These systems can report/alert customers to the following: Regular and special hours for waste services (daily/weekly), which will increase participation in diversion and special waste services Weekly service reminder dates and times Service disruptions Service changes Service reminder notifications Collection of set out and participation data Exceedance of allowable limits for solid waste, recycling, and yard waste Contamination in the recyclables, including warnings and suspension of service Composition information: nascent and quickly developing ability for smart trucks with cameras and/or smart bin identification technologies to collect composition data Notification of longer periods for special collections for bulky waste, and other separated materials (batteries, clean bag-in-bag film, textiles, and household hazardous waste, or e-waste) Special Collection ordering and notification of time of service Storm response schedules in real time
Waste System GPS Real-Time Monitoring and Mapping Systems are a "control tower" for daily services monitoring and management	Oversight management for actors in the waste management supply chain, including contracted privately and municipally run collection and disposal systems.

CATEGORY	FUNCTIONALITY
	Provides GPS placement of mobile assets in a real time mapped location that updates like an airplane control tower monitor. It includes identification of bottlenecks, alternate route, recurring traffic patterns, accidents, and cue time issues. Interacts with mobile phone customer apps to confirm missed pick-ups from mapping records and confirms consequent pick-up scheduled due to missed pick-ups for both residential and commercial sites (if required). The System has been shown to reduce missed calls due to accurate recording of collection. Driving behavior identification and unsafe acts Re-routes in real time to some of these factors Interactions between private service providers and municipalities and back up evidence for evaluating performance

2.4 SMART WASTE MANAGEMENT APPS

2.4.1 Introduction

"Smart" waste management software and applications are systems which use edge device technology to make the solid system more efficient, cost-effective, and environmentally friendly. Most of these systems sport the latest high-level machine tool, the Internet of Things (IoT), a monitoring technology that collects and tracks real-time data to help optimize waste collection and future planning.

Many of these applications have been built as aids to communities and their waste customers and offer one or more functions listed below. The newer ones interact with an integrated waste portal for more accurate real-time information and notifications, and to provide feedback on each function's usefulness. Some of the emerging popular applications and their functions are presented in **Table 3**.

Table 3. Smart Waste Management Apps

FUNCTION	EXAMPLES
Simple and Special Collection Schedules, Notices, and Reminders for Consumers	These applications are most effectively utilized when integrated with real-time, continuously updating enterprise portals, although some may rely on static, pre-programmed information. Many of these apps also provide access to additional resources through links to external websites, such as Call2Recycle, where drop-off centers for batteries can be found or Goodwill for textiles and re-use of household goods. A sample of this widely used format by the private sector is from Evergreen Disposal.
Program Recyclables Accepted	The Recycling Partnership's App for recycling identification, "Recycle Check." This app, and other similar apps, offers the ability to enter a zip code or allow location permissions and receive a clear, yes-no answer about whether to recycle a specific item where you are located. It also enables consumer brands to navigate the complex recycling landscape, reduce label changes, and leverage existing labeling systems. Communities like St. Johns County, Florida use "Recycle Coach."
Access Points for Hard to Dispose, Special Wastes, or Recycling (dead animals, batteries, HHW, tires, bulky, carpet, e-waste, paint)	Earth 911's iRecycle app offers more than 1,600,000 ways to recycle more than 350 materials in the United States. Also, these apps link outside resources like the Call2Recycle database with links to the closest appropriate drop-off location for the item a consumer is attempting to recycle.
Apps that Read RFID Tags in Household Carts	• Used to improve management of carts and performance of recycling, food waste, and yard clipping programs (Greenwalt, 2016). • Management of inventory for expensive roll out carts. Utility: an RFID tag is placed into a roll out cart during manufacturing. When the cart is delivered, the RFID tag is scanned by an app to register that it's been delivered and the type of cart (garbage, recycling, organics, etc.). The RFID tag includes the serial number, coordinates (where the cart was scanned), and time stamp (when cart was scanned) and sends data to a waste portal. This allows real-time

FUNCTION	EXAMPLES
	monitoring of cart delivery and rollout. Anytime the tag is scanned, the information is automatically updated through transmission to the waste portal. • Another interesting use of RFID in carts is to monitor the set-out participation rates of services, like recycling. By knowing the number of carts participating, the zip code of the carts (geo-location), and the daily weight of the truck, the amount recycled per household can be obtained through the data upload. Participation can be managed as well. In this case, the app reader is placed on the automated truck arm and registers that the cart has been lifted from the assigned household.

2.4.2 Other Available Collection System Tools

2.4.2.1 Automatic Vacuum Systems for New Developments

In pneumatic refuse collection systems, waste or recyclables are deposited into inlet ports and transported over long distances through a network of pipes to a central collection station. This system uses negative pressure fans to generate airflow, which enters the pipes at atmospheric pressure, trapping and conveying solid waste to the collection point. At the station, the waste is compacted into sealed containers for further handling (VL Swedish Environmental Research Institute, n.d.).

Studies conducted in Asia and Europe have demonstrated that these systems perform most effectively in dense urban centers. They are typically integrated into the design of new developments or major refurbishments, particularly in settings with limited space for traditional waste storage and truck management, such as large multi-family residential complexes or high-rise business districts (Preville, 2020; Hidalgo et al., 2018).

This technology could be a valuable consideration for future development requirements and building codes in Broward County, potentially reducing traffic congestion and enhancing waste management efficiency.

2.4.3 Future Autonomous Vehicle Collection Technologies

The AI-assisted autonomous vehicle garbage collection and transfer vehicle technology is on the cusp of becoming a reality, with widespread implementation expected within the next two decades. They are most certainly going to be available and widely used during the period of this plan and may be the preferred method for many parts of the supply chain logistical needs, including regular collection and transfer logistics, special collections, public park and beach collection, etc. As this technology advances, understanding its current capabilities and potential is essential for informed planning and adoption.

2.4.3.1 State of Development

AI-driven garbage collection vehicles are among the most researched innovations in waste management, with significant progress made in recent years. Companies like Tesla, Volvo, and Mack Trucks have developed prototypes tested in a variety of environments, including complex urban settings (Szczepanski, 2019; Yin et al., 2022). These vehicles utilize advanced technologies, such as 360-degree monitoring cameras and sensors, to detect and immediately stop for humans, pets, vehicles, and other obstacles, ensuring safe navigation.

Volvo has reported that its autonomous trucks are designed not only to enhance safety and efficiency, but also to improve sustainability. By leveraging machine learning, these vehicles optimize steering, speed, and other operational parameters, which reduces emissions and fuel consumption (Ackerman, 2017; Dyllan Furness, 2017). As the technology matures, route optimization and efficiency are expected to increase, reducing collection times, missed pickups, and overall costs.

2.4.3.2 Addressing Industry Challenges

Autonomous garbage collection offers a solution to several persistent challenges in the waste industry:

- **Eliminating Human Risks:** The waste collection process is inherently dangerous, particularly for workers who walk alongside trucks to manually collect waste. Removing humans from these hazardous roles significantly reduces injury risks.
- **Improving Efficiency:** Traditional collection routes often follow inefficient patterns due to ingrained practices rather than optimization. Autonomous vehicles, guided by AI, eliminate these inefficiencies, ensuring routes are collected in the most cost-effective manner.
- **Solving Labor Shortages:** Many waste collection companies face ongoing staffing issues, especially with legacy rear-loading vehicles requiring manual labor. AI-assisted vehicles reduce the dependency on human workers, addressing this staffing shortfall.

2.4.3.3 Safety and Sustainability Benefits

Modern collection vehicles already mitigate some risks through automation and semi-automation. However, fully autonomous systems represent the next step in removing the human element from dangerous repetitive tasks. By integrating AI for servicing individual waste bins autonomously, these vehicles enhance worker safety and streamline operations. Over time, their ability to learn and adapt for performance optimization will lead to further reductions in emissions and operational costs, contributing to a more sustainable and efficient waste management system.

As this technology reaches scalability, its adoption is expected to accelerate, transforming waste collection into a safer, more efficient, and sustainable process over the next 20 years.

2.4.3.4 State of Play

While autonomous waste collection technology is advancing rapidly, its application in large-scale waste systems remains unproven. Despite manufacturers expressing confidence in its scalability, widespread implementation is estimated to be five to 10 years away. Challenges such as public concerns about autonomous vehicle safety, potential malfunctions, and institutional resistance will

need to be addressed before the technology gains broad acceptance. Currently, AI is improving safety immensely by providing drivers with lane correction and pre-crash notifications in real time. It is expected that full automation, in any event, will be an evolution much like what is happening in the airline industry; however, given the potential savings and money involved, its implementation will move more quickly.

This plan recommends proactively recognizing and planning for the integration of autonomous vehicles into both public and commercial waste collection systems. Preparing now will ensure readiness as the technology becomes viable and widely available.

2.4.3.5 Specialized Autonomous Waste Collection Technology

In addition to large-scale autonomous collection vehicles, specialized systems are being developed and tested worldwide for institutional and public areas, such as factories, parks, and beaches. These systems often take custom forms and focus on specific tasks.

One example is a small robotic collection vehicle, similar in concept to "Wall-E." These robots are designed for limited routes and are dispatched when a collection container sensor signals that it is full. Equipped with 360-degree cameras and sensors, the robot navigates to the container, avoiding obstacles and maintaining safe distances from humans and animals. It then unloads, compacts the waste into a storage area, and transports it to a central transfer point.

Additionally, autonomous litter robots are being deployed for tasks such as lot sweeping and litter collection. Some of these robots are equipped to identify and collect floating debris, addressing significant waste management challenges in waterways like those in Broward County (Lee et al., 2024). While these specialized systems are expected to scale more quickly than route-based vehicles, their widespread adoption is on a shorter timeline.

2.4.3.6 Addressing Physical Strain in Waste Collection

Autonomous waste collection vehicles also offer the potential to address the physically demanding tasks faced by waste collection workers, particularly those operating front-load vehicles. In urban areas, drivers often need to exit their vehicles to manually move heavy dumpsters—ranging from two- to four-yard containers and weighing more than 500 pounds—over uneven surfaces in various weather conditions.

An AI-assisted autonomous collector capable of maneuvering dumpsters to and from the truck would eliminate this labor-intensive and hazardous task. This innovation would not only improve worker safety, but also save significant time. By reducing the need for drivers to repeatedly exit and re-enter the cab to service multiple dumpsters, these systems could increase efficiency and reduce exposure to dangerous conditions.

As autonomous technologies continue to develop, their integration into specialized and large-scale waste collection systems will provide safer, more efficient, and sustainable solutions, positioning municipalities and service providers to meet future demands effectively.

2.5 SCALE SYSTEMS INNOVATIONS

2.5.1 On-Board Scale Systems

Since the passage of RCRA Subtitle D in 1975, most of the U.S. has transitioned to measuring solid waste by mass (tons) rather than volume (yards or truckloads) to comply with solid waste management plans and permit requirements. This shift, driven by increasing disposal fees tied to stricter landfill and incineration regulations, remains a key trend in the industry. Notably, while disposal fees in North America stabilized from 2017–2023, states relying on waste-to-energy (WTE) facilities—such as Florida—continue to experience rising tipping fees, as noted by the Environmental Research and Education Foundation (EREF).

In response to these rising costs, both private and public sectors have adopted **on-board scale systems** to ensure accurate cost recovery. These devices, mounted on truck bodies or lifting arms, measure the weight of individual waste containers during collection. By integrating this data into route management systems and solid waste platforms, these scales eliminate manual processes and provide real-time information.

The benefits of on-board scales extend beyond cost recovery. Charging customers based on weight rather than container size incentivizes waste reduction and recycling. Managers can use integrated apps to notify customers when their waste output increases, particularly effective in addressing food waste. These systems can also periodically weigh smaller residential containers without significantly affecting route productivity.

Additionally, on-board monitors enhance truck safety by signaling when a truck is full, preventing overloading. Data collected by these systems can be analyzed by industry classification (SIC code) or residential zip code, enabling targeted interventions to reduce waste in specific areas. The combination of efficiency, safety, and actionable data makes on-board scales a transformative tool in modern waste management.

2.5.2 'Remote' Truck Scales

Historically, solid waste facilities have faced challenges with long lines at truck scales, leading to inefficiencies for both facility operators and collection truck operators. A decade ago, scale operations were labor-intensive, requiring multiple employees to manually record weights and process tickets for each truckload.

Modern **remote truck scale systems** have revolutionized this process. Utilizing edge technologies such as RFIDs and sensors, these systems automatically identify trucks and their associated accounts when they enter the weighbridge—the platform that measures truck weights. Precise weight data is uploaded directly into the integrated waste system platform, eliminating manual data entry and reducing on-site staffing needs.

These advanced systems offer numerous operational benefits, such as the following:

- **Automated Workflow:** Drivers receive unloading instructions via an on-board computer or from a scale attendant, streamlining the tipping process.
- **Data Integration:** Tagged weight data can be compared with on-board scale measurements, enabling analysis of waste flow patterns by time of day or day of the week.

- **Remote Management:** Facilities can be monitored by a single attendant overseeing multiple sites remotely, much like an air traffic controller.
- **Enhanced Safety:** Cameras monitor truck activity on the weighbridge, ensuring operational safety.

By reducing time on the weighbridge, these automated systems improve fleet efficiency, reduce fuel consumption, and lower operating costs. Furthermore, integration with IoT technology allows for real-time adjustments and enhanced management of waste facilities and fleets. With proper planning, remote truck scales provide a critical foundation for cost-effective and efficient waste management operations.

2.6 COLLECTION SYSTEMS AND DISPOSAL SITE MANAGEMENT AND MONITORING WITH DRONE TECHNOLOGY

When visiting a landfill, one might expect to see the ubiquitous high visibility safety gear, waste collection vehicles, and compactors. In the last ten years—and increasingly in the past three to four—unmanned aerial vehicles (UAVs), more commonly called drones, can be counted among these common sights. Use of drones is beneficial for a variety of reasons; not only do drones provide efficient, cost-effective collection of high-quality data, but they also provide a safer way to access and collect data from dangerous or difficult-to-access areas. Because of the benefits offered by using drones in waste management, applications have expanded far beyond topographic landfill mapping to include lesser-known uses, such as methane detection and combating waste crime.

2.6.1 Example Applications of Drones in Waste Management

2.6.1.1 Topographic Mapping and Volumetrics

Drone-based surveys can be completed, data processing and all, in a fraction of the time required for a traditional land-based survey. Collected data is used to generate high-resolution orthomosaic images, three-dimensional point clouds, and digital elevation models. Once the three-dimensional model is complete, it can be used to calculate metrics such as remaining airspace, stockpile volumes, slope, and—paired with scale house data—compaction rate. Dozens, if not hundreds of landfills including Paducah Site Landfill, Nortes III Landfill, and many others are using drones to reduce costs as well as improve data collection efficiency and quality.

2.6.1.2 Methane Detection and Surface Emissions Monitoring

While the traditional methods for monitoring surface emissions on landfills are physically demanding, time consuming, and pose a variety of health and safety risks, drone-based methods offer solutions that are efficient, comprehensive, effective, and safe. Companies like Firmatek, SCS Engineers, Tetra Tech, and SnifferRobotics use technologies such as Tunable Diode Laser Absorption Spectroscopy (TDLAS) and the patented SnifferDRONE for aerial methane leak detection. While the U.S. Environmental Protection Agency (U.S. EPA) is still weighing TDLAS technology and the resulting reports for regulatory Surface Emissions Monitoring requirements, Sniffer Robotics was granted approval of a new test method, Other Test Method (OTM)-51, as an alternative to the surface emissions monitoring procedures set forth in Federal landfill regulations. The U.S. EPA's letter to Sniffer Robotics stated that the "UAS-based alternative method yields results that are typically no less stringent and often more conservative when compared to those of existing SEM compliance procedures and is thus adequate to determine compliance with the operational limit." Landfills such

as Frank R. Bowerman Landfill in Irvine, CA, a municipal sanitary landfill in Lawrence, KS, and others are using drone-based methane detection methods.

2.6.1.3 Hydrogen Sulfide Monitoring

As one of the key attractions of drones is the ability gather data remotely, particularly where health and safety is concerned, drone-based hydrogen sulfide(H2S) detection is a logical application. Foul smelling and toxic, H2S is not only dangerous to human health beyond certain amounts but is also the culprit behind many odor complaints. In 2023, a team of Brazilian researchers published an article in Analytical Chemistry detailing a "lab-on-a-drone" they created that can sample H2S gas while in the air, analyze collected data, and report results in real-time. Testing was carried out at a wastewater treatment plant; the drone sampled the air at various altitudes and the Bluetooth-enabled detection system transmitted results to the team in real-time. Researchers agree this novel approach to air quality monitoring holds promise for future applications.

SnifferRobotics has taken a different approach to drone-based H2S detection. Using industry studies that correlate the probability that H2S and other malodorous gases may be emitting from the same source as methane, they developed a method using the previously discussed SnifferDRONE to identify low-level methane leak sources over the surface of the landfill. Once these locations are identified, field technicians are deployed to each leak source and manually measure concentrations of other gases. Their studies demonstrate a high correlation of identifying odorous gas emissions sources using low-level methane as a tracer gas.

2.6.2 Waste Crime

Beyond the mere presence of a drone buzzing overhead acting as a deterrent, these versatile machines can be used to combat waste crime in a variety of ways. Drones can be used to monitor locations rife with frequent littering, capture high resolution drone imagery to identify illegal waste sites, document piles of waste stored behind buildings or trees, and collect incriminating data from hostile sites. Drone-mounted thermal cameras have been used to detect heat emitting from illegally dumped waste or even illegally discharged substances into bodies of water back to the point of origin. Evidence collected via drone in these cases has been used in court cases to prosecute those responsible. Cities like Dublin, Ireland, and many others across the United Kingdom are using drones to combat illegal dumping.

2.6.3 Site Inspections

Characterized by their dynamic nature, the presence of heavy machinery, uneven terrain, and other environmental challenges, landfills present a variety of potentially dangerous conditions. Drones provide a means by which to conduct a remote site inspection by quickly capturing high-resolution aerial data. These images can be used to identify potential safety concerns, plan a physical site visit, or investigate operational issues.

2.6.4 Emergency Debris Monitoring

The ability to deploy rapidly and access dangerous areas inaccessible to ground crews make drones an invaluable tool to monitor debris flows remotely in the wake of natural disasters by capturing high-resolution imagery of ravaged areas. These detailed images of affected areas can be used to decipher erosion patterns, changes in topography, and take precise measurements of debris flow deposits. The North Carolina Department of Transportation's Division of Aviation deployed drones to survey bridges, roads, and other infrastructure during Hurricane Milton in October 2024, flying hundreds of missions within the space of a week. Collected data were used to determine water flow,

areas impacted by flooding, and to improve river forecasting models that local, state and federal officials rely on. Similarly, Censys Technologies Corporation used drones to fly over South Daytona's neighborhoods to collect data for post-storm assessments following both hurricanes Helen and Milton. These collected data are not only being used to provide post-storm mapping responses, but also to mitigate future flooding and storm damage.

2.7 AUTONOMOUS LANDFILL MONITORING (GAS, TEMPERATURES, AND LIQUIDS)

2.7.1 Automatic Wellheads

Landfill gas technicians are traditionally responsible for visiting gas extraction wells strategically placed throughout the landfill, using a gas analyzer to ascertain gas composition, and making manual adjustments based on their findings. Automated wellheads have introduced new possibilities. Utilizing sensors permanently installed at the wellhead, automated wellheads measure gas composition and transmit collected data in real-time (Kesari, 2024). In the case of LoCI Controls, one of the companies that sells automatic landfill gas wellheads, automation is used to make small, incremental value adjustments every few hours based on recent measurements. According to LoCI, their automated gas-collection system can increase gas collection by 10% or more (Messics et al., 2018). Hamm Sanitary Landfill in Lawrence, Kansas, has increased methane capture by 32% using LoCI's system (LoCI Controls, n.d.-a). Similarly. The Aria Energy Project in Oklahoma City, Oklahoma, has increased gas flow and plant uptime by more than 30% through installing 50 of LoCI's Controllers (LoCI Controls, n.d.-b). Other sites have opted to use LoCI's sensors on the main legs of their header system to help identify where to start looking for air leaks or dips in incoming gas quality to their gas plants rather than invest in wellheads sitewide.

While automatic wellheads are an exciting and developing area within the landfill industry, there are several critical things to keep in mind when contemplating automatic wellheads:

1. Landfill gas is explosive. Unfortunately, the landfill industry experiences flash fires from landfill gas every year. Engineers must consider this hazard and designate the electrical area hazard classification for the landfill gas wellheads. If they are considering placing electrical equipment into this area, they must make sure that the equipment is rated by FM UL to meet the electrical hazard classification of that area.
2. Class 1, Division 1, Group D is the electrical hazard classification for an area with explosive methane gas concentrations. Class 1, Division 2, Group D is the electrical hazard classification for an area where explosive methane gas concentrations can exist when there is a problem.
3. The performance statements provided to the landfill industry by automatic wellhead companies are based on limited information (e.g., a limited several-month period instead of a several-year period). A comprehensive study of the impact of landfill gas wellheads on landfills is desired and needed for the landfill industry to accurately identify the benefits of this technology.
4. A wellhead is only as good as the vacuum to pull the landfill gas out of the well. If your blower/flare station is not operating well or applying sufficient vacuum (or too much vacuum) your well will not operate correctly, regardless of whether it is manual or automatic. Implementing a flare station Remote Monitoring and Control (RMC) system is a very effective way of improving the operation of your entire landfill gas

well field. The leading provider of flare station RMC systems is SCS RMC. They have implemented several in Florida and dozens across North America.

2.7.2 Landfill Temperature Monitoring

Elevated temperature landfills are an existing and growing area of concern within the landfill industry. One way to help limit the damage from an elevated temperature event at a landfill is to proactively monitor landfill temperatures. Landfills on the East Coast and West Coast have SCS Remote Monitoring and Control (SCS RMC) systems that monitor their landfill gas wellheads and downhole temperatures using Industrial Internet of Things devices. These devices monitor the temperature and report it to a cloud-based dashboard that allows users to see the current and historical temperatures, analyze the data, and receive automatic reports and alarms on the data. These systems have been invaluable to the site operators, engineers, and regulators in analyzing and tracking elevated temperature events within landfills. When used proactively, they can alert you when you have a small problem, and you can act on it to keep the problem isolated and not allow it to spread.

2.7.3 Landfill Liquids Remote Monitoring and Control

Another widespread area of concern within the landfill industry is dealing with the liquids that are present in every landfill. One very successful method for helping to deal with landfill liquids is to utilize a Landfill Remote Monitoring and Control (RMC) system. SCS Engineers has implemented dozens of RMC systems for liquids monitoring and control across North America, including several in the state of Florida. These systems perform several essential functions including but not limited to:

1. **Automatic collection of data –** no person is required to collect data such as liquid levels, runtimes, flows, etc. It's all done automatically. Your people can focus on more important matters and not expose themselves to the health and safety risks that are inherent to landfills.
2. **Cloud-based analysis, reporting, and alarming –** the data is presented in an online dashboard, and users receive automatic reports and alarms based on the data. This allows you to be proactive instead of reactive and keep a small issue as a small issue instead of growing into a large environmental issue.
3. **Interlocking of pumps to the receiving vessels –** pumps are automatically stopped when the location that they are pumping into (e.g., tank, sump, etc.) is full. This minimizes the risk of an overflow and the resulting environmental issues.
4. **Submetering –** RMC systems allow you to know how much liquid each area generates and what the liquid levels look like across your site. This allows you to know where you may have an issue and act on it before it becomes a larger problem.

Together, these RMC systems can help you to:

- Save time
- Save money
- Improve environmental compliance
- Reduce health and safety risk
- Improve quality of life for the facility's neighbors and the workers at the facility

2.7.4 Artificial Intelligence-assisted Autonomous Vehicles at Landfills, Material Recovery Facilities, and Transfer stations

Landfills, material recovery facilities (MRFs), and transfer stations operate as bustling hubs of activity, with a constant flow of people, machinery, and vehicles. The environment always demands heightened situational awareness, as trucks are frequently entering and exiting, drivers are outside their vehicles inspecting waste loads, and front loaders are in continuous motion to manage the movement of waste within the facility.

The complexity of these operations suggests that reducing the human factor could lead to improved coordination, efficiency, and safety at landfills, MRFs, and transfer stations. Automation and technology may offer a path toward a more streamlined and well-orchestrated operational process.

2.7.5 Other Artificial Intelligence-assisted Landfill Applications

Current landfill operations often require collection or transfer vehicle drivers to exit their vehicles to perform tasks, creating a high-risk environment given the numerous activities taking place at the working face. Implementing AI to automate these manual functions presents a significant opportunity to enhance worker safety.

For instance, an AI-assisted device could be used to clean seals at the back of the vehicle, allowing the driver to remain safely in the cab. Additionally, AI could be deployed to monitor and manage fires at landfills, particularly as the frequency of fires linked to lithium batteries continues to rise. These applications of AI have the potential to reduce risks, improve operational efficiency, and ensure safer working conditions for landfill personnel.

2.7.6 AI Monitoring of Cart Images During Dumping /Enforcement App

AI can be used to power smartphone apps that monitor contamination in each waste stream. These apps can be used to increase the efficiency of waste collection in addition to helping identify areas for municipalities and institutions to educate, engage, and correct resident behavior (CSUN Sustainability, 2024). These systems can also be used to identify overflowing bins to assist in streamlining collection efforts. Current use cases primarily exist in the private and institutional sectors. An overview of contamination monitoring app is presented in **Table 4**.

Table 4. Contamination Monitoring Apps

Footprint required	Little to no footprint. All operations can be done through smartphone apps or additional cameras.
Capital expense range	AI powered camera startup City Detect installed cameras on garbage trucks to monitor for litter and illegal dumping at a cost of $48,000 for a pilot to the City of Columbia. A full-scale implementation will cost the city 108,000/year (Leibman, 2024). A widely available, already accepted application is metroKey for anti-contamination.
Details required for consideration and prioritization based on a desktop analysis	Pros: Ability to target generators with highest contamination rates with price increases AMCS offers recording AI service to identify overflowing bins and identify hazardous material (Leibman, 2024) Cost savings from more targeted education initiatives Some systems can also help with code enforcement in other departments (Leibman, 2024) Cons: App-based systems may require additional staffing or training for current staff to monitor bin levels Privacy concerns from residents (Leibman, 2024)
Recovery output (diversion)	Marriott Hotels- used AI Monitoring to reduce food waste by 25% across 53 of its European hotels (George, 2024) Yale University Dining Hall system anticipated to reduce food waste by 30% by next year (Gao, 2024)
Emissions ranges	Marriott Hotels- Estimated mitigation of 486 tons of GHG emissions over course of six-month pilot (George, 2024)
Automation potential, elimination of dangerous repetitive jobs	Some programs can identify dangerous materials in bins and provide alerts to haulers/municipalities to prepare operators to handle hazardous material properly (AMCS)

2.8 AI AND SORTING ADVANCEMENTS INCLUDING ROBOTICS, RECIRCULATION AND SMALL FORMAT RECOVERY

2.8.1 Introduction

Dry solid waste materials which enter waste and recycling streams are constantly evolving, requiring a flexible response to cleaning, sorting and baling through new technologies. For instance, in just the last two decades, packaging has exploded as a percentage of the waste stream and source separated recyclables streams (i.e., dual and single stream). At the same time, the amount of glass, metal and free sheet fiber flowing through these streams has decreased, as a preference for the flexibility of plastics increased. Finally, the movement away from these primary materials to plastics

has come with numbing complexities that make recovery harder, including packages and consumer items utilizing materials with new chemistries and formats, i.e., multi-material packaging.

In addition, household and commercial waste collection efficiencies have increasingly optimized the movement of both recyclables and mixed solid waste to either recovery or disposal at lower and lower costs, by maximizing the mass/volume per route trip and reducing the dangers of solid waste collection to truck operators through automation. Collection automation and compaction naturally adds entropy to solid waste from these increasingly complex streams through the relatively new entry of containerized waste system with little-to-no inspection of materials followed by mixing of materials and their increasing densification after collection. Finally, during the same time, processing plant manual sorting of increasingly lighter weight, downgauging, and densified packaging, along with the increase in small format packaging became less accurate, resulting in greater cross contamination of materials. Processing these materials has become a challenge. In fact, during this same 20-year period, the cost of manually sorting recyclable materials in a single stream has more than doubled (for instance, from ~$15-25 per ton at the beginning of this century to more than $35-60 per ton, with some costs twice that range, (i.e., small Single Stream MRF facilities which are still manual). In sum, accurate sorting of the waste and recycling streams decreased as sorting of waste and recyclable stream became more complex.

2.8.2 Artificial Intelligence for Sorting Solid Waste Materials

2.8.2.1 Why AI Has Developed

Manual sorting for recyclables at solid waste facilities is a dangerous and repetitive job with high injury rates and exposures, in an environment that is stressful and loud. These jobs have increasingly lower efficiency and increasingly higher employee turnover rate, along with predictably lower and inaccurate capture rates compared to automated sorting.

Artificial intelligence (AI) use in sorting applications for both sources separated and mixed waste recovery applications has expanded rapidly as these dangerous manual jobs go unfilled. AI-assisted tools combine with mechanical methods of automated sorting (screens, air density separation, magnets and eddy currents) to reduce manual sorting in MRFs by more than two thirds in less than a decade. AI sorting recognition will one day make most sorting in material recovery facilities (“MRFs” or “RMPFs”) and front-end mixed waste processing facilities (MWPFs) fully automated. Already there are fully automated MRFs in Europe and Asia under construction (ZenRobotics, 2023).

2.8.2.2 Sorting Machines and AI

AI systems harness the ability of computer programs to perform tasks mimicking, sometimes surpassing, human skills. These systems continually improve upon their already impressive capabilities by adhering to the principles of machine learning, a process by which computers use large and constantly evolving datasets to better anticipate and react to different inputs with more flexibility than conventional programs.

There are two AI sorting machines which dominate recycling sorting and continue to evolve, optical sorters and robots. Both use similar AI-capabilities combined with sensors and imaging technology to sort materials based on a variety of optical properties including color, transparency, reflectivity, and shape. The emergence of image recognition technology (shape/color/size) was first used by AMP Robotics and now is quickly spreading to new optical sorters, which heretofore used near infrared, x-ray, and magnetic image identification. Sensors can also identify smart marks on packages to achieve more efficiency. Each kind of machine automates formerly manual tasks. Optical sorters are

10 times faster than robots, with the ability to separate 600 targeted units per minute compared to the 60 picks/min. capacity of most robots (Barker, 2021).

2.8.2.3 Optical Sorters with AI

Optical sorters have been in use for a longer period and are more widely recognized by MRF operators than AI or robotics. As a result, optical sorters remain the leading and most efficient technology for separating recyclables into distinct, marketable bales. These devices are the most advanced and efficient sorting tools available to MRF operators, capable of targeting nearly 95% of properly prepared materials moving at speeds between 800 and 1,000 feet per minute.

Modern optical sorters have advanced beyond their earlier versions by improving air nozzle placement, widening accelerator conveyors, and incorporating air-assist features that prevent fiber from unintentionally moving until ejected by the operating system. Furthermore, costs for these newer models have started to decline, making them more accessible to operators.

The core technology relies on sensors that detect materials based on light absorption and reflection as they pass along a conveyor line. Data collected by these sensors is processed by computers, which direct air nozzles to sort the material toward the appropriate stream. While optical sorters predate AI, the integration of AI has significantly enhanced their capabilities. Modern AI-powered optical sortation systems combine traditional sorting mechanisms with advanced AI, leveraging higher quality image recognition and cloud storage to improve both individual system performance and overall operational efficiency.

The AI algorithms underpinning these technologies enable them to learn continuously, automatically detecting attributes such as size, shape, chemical composition, and magnetic signatures to distinguish between various materials, including plastics, metals, glass, and fibers. These processes occur at very high speeds, improving sorting accuracy and speed with every pass.

The latest AI systems utilize triangulated detection methods that combine camera image recognition with chemical analysis, allowing for more precise decision-making regarding whether a material should be classified as recyclable or non-recyclable. Furthermore, with all sorts, AI-assisted 3D or camera recognition systems learn from the classification of more material types and their respective characteristics—such as size, color, shape, and depth—resulting in continually improved performance and system-wide efficiency.

2.8.2.4 Robots and AI

Robots have significantly advanced the application of machine learning in recycling and recovery processes. However, their use remains constrained by certain limitations, including inefficiencies in “gripper” performance and the necessity for effective material singulation. Current robotic systems lack the ability to manage the diverse range of three-dimensional objects — of various shapes, sizes, and densities — due to the absence of advanced suction cup or mechanical hand designs. Moreover, their performance tends to decline when dealing with most two-dimensional materials.

When compared to optical sortation, robotic systems demonstrate a higher missed pick rate — ranging between 20% and 35% — after identifying target materials. Despite these performance challenges, robotic systems can still be advantageous, particularly in smaller, retrofit applications where speed and cost are key considerations. Robots are generally less expensive than traditional optical sorting systems, although the gap is narrowing with the introduction of newer, less costly optical sorters that eliminate the need for high-speed, expensive conveyors.

Robotic systems are especially effective in slower-speed applications with limited non-targeted collateral materials. They are commonly utilized in a presorting capacity within materials recovery facilities (MRFs) to evenly distribute material across the conveyor belt and remove oversized recyclables or contaminants before additional processing. However, robots are not without limitations. Materials that are overly greasy, such as certain plastic films, or challenging items like crumpled aluminum cans, are difficult for robots to grip effectively. Additionally, maintaining these systems is critical, as robots require regular upkeep and gripper replacement to maintain peak performance.

A notable example of successful robotic implementation is the dual-stream MRF in Emmet County, Michigan. The Emmet County Recycling (ECR) MRF underwent a significant retrofit in 2020, involving the addition of a surge bunker and three consecutive robots. This redesigned container line supports a recirculating system that reduces reliance on manual sorters, many of whom previously faced high turnover rates.

The versatility and programmability of the robotic system have enabled ECR to sort a broader range of materials, including end markets that were previously inaccessible. By designating specific surge bunkers for trial bales, ECR can test new material capture rates without disrupting ongoing operations. Notably, they reprogrammed the robots to focus on pill bottles and sleeve-wrapped PET bottles — two material types that align with their end market requirements. This strategic use of robotics has proven both adaptive and cost-effective for rural MRF operations.

2.8.2.5 Recirculation and Redundancy with AI-assisted Optical Sorters and Robots

One of the most promising and transformative trends in AI-assisted sorting is the reintroduction of recirculation into modern MRF (Materials Recovery Facility) sorting systems. Originally, recirculation was employed during the early days of source-separated recycling when efficiencies were achieved by mixing materials for transportation. Circular or recirculating conveying systems allowed recyclable materials multiple opportunities to be sorted into distinct categories, improving overall recovery rates. During this period, human sorters would identify unprocessed materials from the discharge residue line and place them onto circular sorting systems—similar in design to airport luggage turntables—allowing these materials to pass by sorting mechanisms a second time for targeted separation into commodities such as metals, plastics, and glass.

Recently, several MRF equipment manufacturers—including AMP, VanDyk, and Steinert—have reintroduced the concept of recirculation into new and retrofitted MRFs as of 2024. This technology is also being adopted in select MWPFs in Europe and Virginia. The strategy has demonstrated promising results, leading to increases in recovery rates of five to 15% for paper, plastics, and certain metals while simultaneously reducing material loss due to cross-contamination.

In high-speed MRF operations, inefficiencies often occur due to the sheer volume of material moving quickly along conveyor belts. Sorting devices can become overwhelmed, leading to misdirected materials, including non-targeted waste being inadvertently moved with targeted recyclables. These misdirections contribute to a reduction in sorting efficiency, particularly as materials become more complex and less homogeneous.

With AI-assisted recirculation, these inefficiencies can be mitigated by positioning optical sorters or robotic devices at key ejection points, such as the residue line or the final quality control sorting location (e.g., the last sort on the old corrugated cardboard (OCC) line). Previously, this sorting would rely on manual labor, especially during periods of high commodity pricing. Now, AI-enabled

technologies can identify up to three missed or mis-sorted items at once, accurately sorting them into designated takeaway conveyors that return them to the initial sorting protocols for targeted recovery. This allows for repeated opportunities to recover these materials even if they are missed multiple times during the sorting process.

This modern, AI-driven reimagining of recirculation offers significant promise, particularly for processing traditional rigid containers such as plastic bottles, jars, and metal cans. By allowing these items additional opportunities for recovery through enhanced recirculation flows, reported recovery capture rates for certain rigid containers have been more than doubled.

Moreover, this approach offers a dual benefit for MRFs that can accommodate the technology at scale. The first advantage is a reduction in disposal costs, as less waste is sent to landfills. The second is increased revenue through the recovery and sale of additional captured recyclables. When combined, these benefits position AI-assisted recirculation as an efficient, cost-effective, and environmentally beneficial innovation in modern recycling operations.

2.8.2.6 Trajectory of AI Driven Innovation

A key aspect of these technological advancements is their adaptability and dynamic capabilities. As waste streams evolve in response to shifting consumption patterns nationwide, machine learning identifies these trends in real time, adjusting sorting strategies to ensure optimal targeting and recovery. Similarly, automation technologies can be reprogrammed to meet changing end-market demands.

The integration of AI into waste and recycling sorting applications was facilitated by the development of robotic systems. However, as limitations such as the maximum number of picks per minute and higher miss rates with robotic sorting became evident, the industry shifted its focus toward AI-driven enhancements in optical sorting technologies. This transition has spurred significant progress, as AI continues to advance the capabilities of sorting systems.

Innovative approaches, such as “nested loops” of optical sorters, now enable systems to dynamically adjust sorting decisions in response to real-time changes in material flow and characteristics. This allows sorting operations to maintain functionality while individual units are taken offline for maintenance, thereby improving overall uptime. Furthermore, “recirculation” technologies continue to enhance these systems by redistributing unsorted material streams, thereby improving the recovery of a greater fraction of recyclables over time.

Additionally, the ability to collect high-quality data on waste streams opens new opportunities for monetization. Brands increasingly value detailed audit trails of their packaging products, while stewardship programs benefit from tracking recovery rates with SKU-level precision.

Although substantial progress has been achieved with advanced optical sorting technologies, several challenges remain. For instance, while optical sorters are highly effective at identifying many types of recyclables, they still face difficulties with thin-walled polyethylene terephthalate (PET) bottles, contaminated items with excessive dirt, and black plastics. Moreover, they struggle to sort items composed of a single base material that are wrapped in a different material, such as shrink-sleeve-labeled PET containers. These limitations highlight opportunities for ongoing research and innovation to further refine the performance and capabilities of optical sorters.

2.9 NEW END MARKET TECHNOLOGIES FOR FLORIDA

2.9.1 Summary

During the planning horizon, it is important to utilize existing and explore emerging end-market technologies for traditional recyclables, particularly given the Authority's geographic distance from domestic end markets and its unique seasonal patterns. The Authority will experience an influx of solid waste during the winter months, when production rates for metals, plastics, glass, and paper tend to be historically low. Additionally, the Authority's reliance on exports will remain vulnerable due to disruptions in these systems over the past decade.

Investigating these new end-market technologies can provide alternative recycling outlets, especially during periods when traditional South Florida end markets are unstable. Furthermore, these innovations could enhance local recycling capacity and foster greater resilience within the regional recycling system. **Table 5** presents an overview of end market technologies and its maturity status

Table 5. End Market Technologies and Maturity Status

END MARKET TECHNOLOGY	INPUT	OUTPUT	STATUS
Small Footprint Fiber Pulping Facilities- wet hydro pulping or dry shredding- can be built locally based on permitting and wastewater treatment availability in much smaller footprint than recycled paper mills.	OCC, Mixed Paper	Wet, dried, or dry Pulp for sale to mills or export to Asian market (surrogate mills for China in Asia big-5 economies)	TFRC, a joint venture between BHS and Cellmark opened an $80M, 200,000 ton-capacity facility in Tidewater, Virginia. Too soon to recommend. Several small dry pulp surrogates for Chinese mill interests have sprung up on the Southeast coast, and some are still in the planning stages. Wet pulp freight may limit viability in low markets. Costs much lower than full papermill. Several start-ups are in development.

END MARKET TECHNOLOGY	INPUT	OUTPUT	STATUS
Chemical Recycling	Polypropylene, polyethylene, other plastic containers	Processes that use high heat, chemicals, or both to break down plastics into their chemical building blocks. Most plastic containers are downcycled and have long freight from So. Florida.	2025 will be a big year for this emerging technology. Too soon to recommend development. Expensive footprint. 11 plants will be on-line by 2026 with a capacity of 500K TPY. Two very small facilities in Florida and Georgia. These could not handle South Fla recyclables. LyondellBasell is building a large facility in Texas.
Glass to Pozzolan Facility for Glass Recycling	Glass bottles	There is only one glass processor in Florida in Sarasota and almost all glass collected in curbside programs goes to landfill cover in south Florida. Unfortunately, almost zero is recycled in the state south of the Palm Beach County line. There has arisen some competition due to the successful substitution of pozzolanic materials for fly ash in the manufacture of cement (Concrete Materials Research - Herbert Wertheim College of Engineering, n.d.; *Pozzotive*, n.d.).	Several operating entities have pozzolanic production operations and there is a need for clean fly ash substitute for cement with production of coal expected to continue to decrease (DeFord, 2016). The region, including surrounding East coast counties, may produce enough recycled bottle glass to make this end market work.

3.0 ADVANCED MIXED WASTE TECHNOLOGIES

3.1 INTRODUCTION

The history of mixed waste processing reflects centuries of urbanization, evolving from simple waste picking to advanced technologies designed to recover valuable materials and reduce landfill use. A short summary of the last 60 years of modern waste management is provided in the Appendix for reference. The evolution of waste management during this period mirrors shifting priorities toward resource recovery and environmental sustainability, focusing on emission reductions, energy savings, and beneficial reuse, rather than the former 'out of site/smell/vectors range, out of mind' of local burning or burying. However, advanced mixed waste technologies still struggle to compete in an economically viable manner with cheaper and more reliable methods like landfilling and traditional waste-to-energy due to the high entropic factors of mixing heterogeneous materials together. In North America, more than 400 such facilities have opened and closed in the past 60 years, resulting in billions of dollars lost — especially outside highly regulated areas like California. Underperforming or failed facilities rates have been unacceptably high and continuous, and, except for special purpose facilities (like those in highly regulated California) no stand-alone mixed waste facility has sustained itself over its predicted lifetime. More than 95% of those in start-up and operation have closed within 10 years.

However, advanced processing technology is improving and there is reason to believe that economic viability and technical feasibility is beginning to overlap. On the West coast, and in Europe, waste technologies have evolved through key developments in municipal solid waste (MSW) recycling, composting, refuse-derived fuel (RDF), and mechanical and thermal treatment methods like mechanical biological treatment (MBT).

Mixed waste processing has progressed from basic disposal methods to increasingly sophisticated technologies aimed at maximizing material recovery and reducing landfill reliance. Initially centered on landfilling and incineration, waste management evolved with rising environmental concerns, spurring innovations in recycling, composting, refuse-derived fuel (RDF), and mechanical biological treatment (MBT). The 1990s established dual stream recycling, which quickly transitioned to single-stream recycling as more equipment capability emerged. On the MSW side, progress toward more advanced RDF production continued, though challenges with contamination remained.

In the 2000s and 2010s, new thermal treatments like gasification and pyrolysis, along with the shift toward a circular economy, created more opportunities for recovery. The adoption of digitally informed sorting, chemical recycling, and carbon capture technologies signals a new era of possibilities. Continued innovation in waste processing holds promise for higher recovery rates, sustainable material reuse, and the development of near-zero-waste systems, paving the way for a more efficient and circular approach to waste management. Today significant opportunities for evolution in recovery depend on exploiting AI driven sorting technologies and new approaches to manage organic streams in a way that limits carbon emissions and controls PFAS contamination.

3.2 THERMAL CONVERSION TECHNOLOGIES

A central challenge with managing MSW is that it is heterogeneous in terms of composition and particle size. Accordingly, any thermal conversion technology must be operationally robust to effectively and efficiently process MSW as it is delivered. Accordingly, the following presents the current state of the industry for thermal conversion technologies. It should be noted that the "commercially proven" are provided for context, while the "emerging" and "developing" technologies

are presented to address innovative and future technologies. For each thermal conversion technology, the following data is presented:

- Technology;
- System;
- Status;
- Location;
- Typical Cost or Tipping Fee Range;
- General Description;
- Pros;
- Cons; and
- Processing Capacity.

The thermal conversion technologies were categorized in terms of their stage of development. The following definitions were used to categorize the technologies:

> **Commercially Proven Technology:** *A technology that has been designed, constructed, and operated/implemented in the United States on a commercial scale (not a pilot plant or research facility) for at least one (1) year in a reliable and consistent manner. The technology's capacity is appropriate to manage the quantity of material typically produced, and products of the processing have been effectively marketed. There may be some concerns regarding environmental issues, costs, regulatory issues, land use, etc., associated with such a technology.*
>
> **Emerging Technology:** *A technology that has been designed, constructed, and operated or implemented on a small-scale or pilot-program basis. Technologies may have been operated and shut down, may be currently operating, but experiencing significant reliability problems, or have not been operating in the United States on a commercial basis. There are or may be significant concerns regarding the technical reliability, marketing of products, environmental issues, costs, regulatory issues, land use, etc., associated with the technology.*
>
> **Developing Technology:** *A technology that has been conceptualized, patented, or designed on a small-scale or pilot-program basis. Technologies have not been operated on a pilot or commercial basis. There are or may be significant concerns regarding the technical reliability, marketing of products, environmental issues, costs, regulatory issues, land use, etc., associated with the technology.*

Each thermal conversion technology was evaluated into one of the three stages of development identified above. The solid waste processing technologies are presented below in **Table 6**.

Table 6. Status of Solid Waste Thermal Conversion Technologies

Commercially Proven	Emerging	Developing
Mass Burn Combustion	Gasification	Plasma Arc
Refuse-Derived Fuel Combustion	Pyrolysis	Plasma Arc/Gasification
		Pyrolysis/Gasification

3.2.1 Thermal Conversion Technologies

3.2.1.1 Mass Burn

Mass Burn Combustion, also known as WTE, has a proven operating record using units of varying capacities and configurations up to and exceeding 750 tons per day (tpd) per process train. WTE provides for residual minimization and generates useful byproducts that include:

A. Heat for steam generation, energy recovery, and electric sales;

B. Ash residue that is potentially reusable; and

C. Recovered ferrous and non-ferrous metals.

WTE requires sophisticated air pollution control (APC) equipment to operate within regulatory compliance standards. Physical separation may be used to complement mass burn systems. Potential benefits from the removal of large objects and metals prior to combustion include improved combustion and energy recovery from mass burn systems. Lower operations and maintenance (O&M) costs and higher system reliability. Depending on the level of physical separation, lower air emissions may be realized as well. However, pre-processing will increase operational requirements (e.g., increases in staff, equipment and O&M of the pre-processing system). In addition, should the removed materials not be marketable (if intended), additional system costs will be incurred.

WTE uses oxygen available in combustion air at temperatures approaching 2,200° F. Mass burn plants accept mixed MSW and require little pre-processing (minimally limited to the removal of hazardous wastes and oversized objects). However, large scale physical separation of MSW has been attempted with mixed results as operations have been challenged by operational difficulties, quality of separated materials (i.e., ability to meet market requirements), market conditions, and operating costs.

Combustion byproducts from WTE include heat and ash residue. The heated combustion gases are exhausted to a boiler for heat recovery and electrical generation, with the off-gases treated (cleaned) at atmospheric pressures and subsequently released to the environment. Modern WTE plants are reported to generate 500 to 600 kWh/ton (net of in-house usage).

Ash residue is generally managed as combined fly ash and bottom ash. Combined ash, which consistently meets regulatory standards for non-hazardous waste, may be recycled. Several combustion projects have ash recycling programs. Metals, both ferrous and nonferrous, are typically removed post-combustion from the ash. As the ash reuse market matures and chemical testing continues to demonstrate the non-hazardous nature of the ash, opportunity to further increase the marketability of the combustion system's solid residues exists.

The Solid Waste Authority of Palm Beach County (SWAPB) has worked with the University of Florida (UF) on several projects to develop beneficial reuse methods for ash. There is also collaboration with the Florida Department of Transportation (FDOT) to develop specifications for use of MSW combustion ash in asphalt.

Covanta has also worked on developing a procedure of refining ash into a product that could achieve beneficial use from aggregate producers[1]. Facilities would be able to reduce the ash sent to a landfill for disposal and aggregate producers would reduce costs in mining for virgin sand. In 2014, Pasco County in Florida worked with UF on a Research, Development, and Demonstration Project to construct a test roadway using WTE bottom ash as a road base and aggregate[2]. The ash was cured and reduced to two (2) ash fractions for use in the road construction. Testing for leachability was completed on cured ash and ash products. Structural tests were performed on the mixed concrete. The preliminary results were positive and the County continues work on ash recycling. Lee County also contributes to ash recycling efforts by exploring the placement of ash into a kiln to make cement used for concrete[1].

In the United States, there are reportedly 60 WTE facilities, with a total generating capacity of 2,051 megawatts (MW)[3]. Florida has the largest number of WTE facilities by state, with the most recently constructed facility commissioned in 2015 in Palm Beach County. The facility, Renewable Energy Facility 2, which is shown in **Picture 1**, has a capacity of 3,000 tpd and reportedly cost more than $600 million to construct[4]. The SWAPB investigated various options for extending the life of their landfill, including a landfill expansion and other conversion technologies, but ultimately decided to pursue the construction of a mass burn facility. Coupled with the design to reduce the volume of

[1] Can Ash Be Transformed from Waste to Desired Commodity? (waste360.com)
[2] Microsoft PowerPoint - 15_05_01 NAWTEC Presentation (ufl.edu)
[3] https://www.eia.gov/todayinenergy/detail.php?id=55900
[4] https://www.swa.org/Facilities/Facility/Details/Renewable-Energy-Facility-2-11

waste landfilled by more than 90% and metals recovery, the existing landfill has a current life capacity up to 2054 – based on the 2023 Landfill Depletion Model published by the SWAPB[5].

Picture 1. Renewable Energy Facility 2, Palm Beach County, Florida

Scaling up and expansions have been implemented on existing WTE facilities in circumstances where it is more economical to renovate an existing facility rather than close a plant for alternative disposal methods. The Covanta Energy Corp., one of the largest WTE facility operators in the U.S., underwent an expansion of the Niagara Falls facility in New York in 2015[6]. As part of the proposed $30 million expansion project, Covanta also added railroad access to transport the waste via train[7].

Some WTE facilities allocated areas for future expansion during the design and permitting stages of development to allow for facility expansion either when disposal needs increased or when additional funding was available. An example is the WTE facility located in the Pinellas County Solid Waste Disposal Complex, which is shown in **Picture 2**. The facility was initially constructed in 1983 with two (2) boilers and one (1) turbine generator. In 1986, an additional boiler and turbine were added to allow a capacity of 2,700 tpd[8].

Picture 2. Pinellas County WTE Facility by Pinellas County

Similarly, the two (2) WTE facilities constructed in Broward County in the 1990s, were designed to be able to add a fourth boiler in the future, allowing for each plant to process up to 3,000 tpd[9]. The North Broward Resource Recovery Facility closed in 2015, following a Broward commissioners vote to allow Waste Management, the owners at the time, to stop accepting waste for combustion[10]. The tipping floor of the facility is still used as a transfer station; however, most of the facility is closed off.

A case where closure was more economically preferable than redevelopment was in Connecticut with the 2022 closure of the Materials Innovation and Recycling Authority (MIRA). A combination of low power prices and mechanical breakdowns led to decreased revenue for the plant to the extent that transporting waste outside of the state would be slightly cheaper[11]. After a 2020 proposal for $330

[5] Landfill-Depletion-Model-PDF (swa.org)
[6] https://www.conteches.com/knowledge-center/case-studies/details/slug/covanta-wte-rail-to-truck-intermodal-facility
[7] Covanta's $30M WTE expansion project approved | Waste Dive
[8] https://pinellas.gov/waste-to-energy-facility/
[9] https://www.broward.org/BrowardNext/Documents/CompPlanDocs/Solid-Waste-Element-Supp-Doc.pdf
[10] https://www.waste360.com/waste-energy/broward-garbage-energy-plant-will-close
[11] Major Hartford trash-burning plant will close within days, MIRA says | Connecticut Public (ctpublic.org)

million in state subsidies was rejected to redevelop the plant, the MIRA announced they would close. Connecticut will continue to transport waste to out-of-state landfills until lawmakers and municipalities determine a long-term solution.

A process flow diagram for mass burn combustion facilities is presented in **Figure 1**, which is followed by **Table 7**, which presents a summary of attributes associated with mass burn combustion.

Figure 1. Process Flow Diagram for Mass Burn Combustion Facilities (typical)

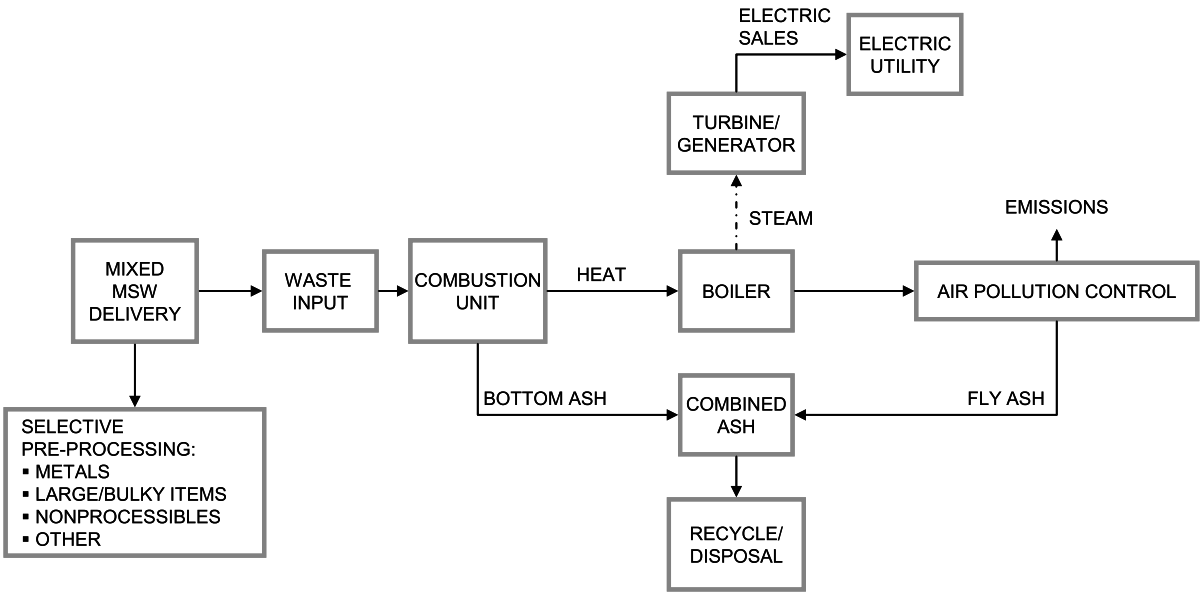


Table 7. Attribute Summary for Mass Burn Combustion Facilities

Status	Commercial
Location(s)	Worldwide
Typical Tipping Fee Range	$50-$100+ per ton
Processing Capacity	>600 tpd
Pros	▪ Commercially effective and reliable for more than 30 years in the U.S.; ▪ Large potential processing capacities; ▪ Technology available from many commercially-viable vendors and operators; ▪ Processes mixed MSW; ▪ Combined ash residue is reusable; ▪ Heat generated produces steam and electricity; ▪ Net electric generation ranges from 500 to 600 kWh/ton processed; ▪ Mass and volume reductions typically 90%; and ▪ Proven to meet regulations.

Cons	▪ Some physical separation required; ▪ Materials recovered via physical separation not meeting market requirements could add to costs; ▪ Widespread popular opposition; ▪ High capital costs; and ▪ Some landfilling still required.

3.2.1.2 Refuse Derived Fuel (RDF) Combustion

Refuse Derived Fuel (RDF) facilities include mechanical steps to extensively separate, sort, and/or size waste materials to produce the waste feedstock (e.g., homogenous, densified, etc.) required for the subsequent combustion processing system. RDF is fed directly to a combustion system. The RDF production process, an example shown in **Picture 3**, can vary depending on feedstock materials and desired output. Most common steps used in the RDF production are sorting, shredding, magnetic separation, air classifier, and briquetting.

The combustion of RDF uses oxygen available in combustion air at temperatures approaching to 2,500° F. Combustion of RDF accepts unsorted MSW, with pre-processing to prepare the combustible portion (the RDF). Pre-processing systems are operationally complicated and can be labor and O&M intensive. Additionally, the cost of pre-processing may not be offset by the sales of recovered materials (recyclables), should market availability or dependability not be consistent.

Picture 3. RDF Processing Plant by WiSCON Tech

Combustion byproducts from RDF include heat and ash residue. The heated combustion gases are exhausted to a boiler for heat recovery and electrical generation, with the off-gases treated (cleaned) at atmospheric pressures and subsequently released to the environment. Modern combustion plants are reported to generate 500 to 600 kWh/ton (net of in-house usage).

Ash residue is generally managed as combined fly ash and bottom ash. Combined ash, which consistently meets regulatory standards for non-hazardous waste, may be recycled. Several combustion projects have ash recycling programs. Metals are typically removed post-combustion from the ash. As the ash reuse market matures and chemical testing continues to demonstrate the non-hazardous nature of the ash, opportunity to further increase the marketability of the combustion system's solid residues exists.

Combustion of RDF is similar to mass burn except that due to increased homogeneity of the fuel, the combustion system and the boiler are of simpler design, somewhat mimicking fossil fuel combustion

boiler system. The energy efficiency is higher than mass burn system; however, pre-processing energy use and the need for drying can erode this advantage on an overall basis.

The Miami Dade Resource Recovery Facility, which is presented in **Picture 4**, is an RDF plant located in Doral, Florida that began operation in 1982. Over the years there have been many processing and technical difficulties. Most recently in early 2023, the facility experienced a fire that resulted in an unexpected closure that continues today.

Picture 4. Miami Dade Resource Recovery Facility by Miami Today News

Prior to the fire, and consistent with its 2020 Master Plan, Miami-Dade County planned to procure a new mass burn facility with the capacity of 4,000 tpd, with an expected cost between $900 million to $1.5 billion [12]. However, the plans are currently on hold while Miami-Dade County re-evaluates its needs and options. This is, in part, due to opposition to WTE facilities largely stemming from public perception of emissions from WTE facilities and perceived potential harm to human health.

The SWAPB also has an RDF plant, Renewable Energy Facility 1, which began operation in 1989 with a capacity of 2,000 tpd. The plant is able to process up to 3,000 tpd for limited periods. The bottom and fly ash generated during combustion is transported a short distance to the SWA Class I landfill. Although this plant is still in operation, changes in the waste stream and experience with the RDF plant, led SWAPB to choose a mass burn combustion facility for the Renewable Energy Facility 2.

A process flow diagram for RDF combustion facilities is presented in **Figure 2**, which is followed by **Table 8**, which presents a summary of attributes associated with RDF combustion.

[12] https://www.miamitodaynews.com/2022/04/19/miami-dade-may-move-its-resources-recovery-facility-from-doral/

Figure 2. Process Flow Diagram for RDF Combustion Facilities (typical)

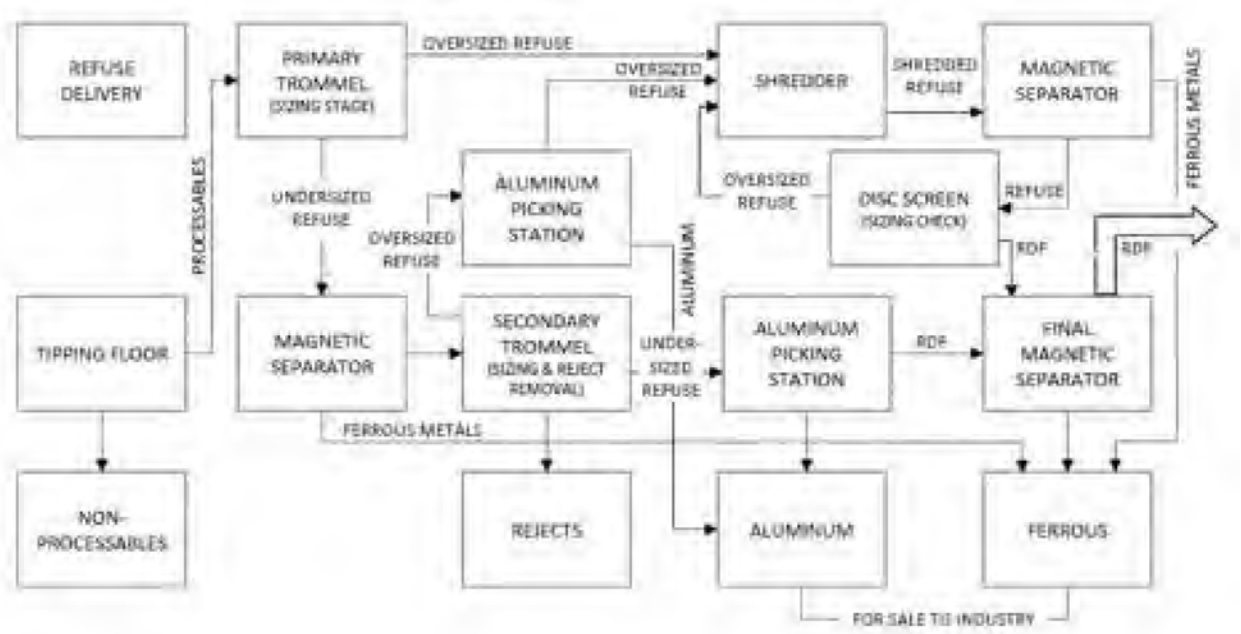


Table 8. Attribute Summary for RDF Combustion Facilities

Status	Commercial
Location(s)	Worldwide
Typical Tipping Fee Range	$70-$120+ per ton
Processing Capacity	>750 tpd
Pros	▪ Commercially effective and reliable; ▪ Large potential processing capacities; ▪ Technology available from many commercially-viable vendors and operators; ▪ Processes mixed MSW; ▪ Better quality of separated materials, increased recyclables; ▪ Lower air emissions than mass burn; ▪ Proven to meet regulations; ▪ Combined ash residue is reusable; ▪ Heat generated produces steam and electricity; ▪ Net electric generation ranges from 500 to 600 kWh/ton processed; ▪ Mass and volume reduction typically 70 % and 90% respectively; and ▪ Energy from RDF recoverable through additional processes, such as combustion or conversion.

Cons	▪ More physical separation and shredding required; ▪ Materials recovered via physical separation not meeting market requirements could add to costs; ▪ Marketability of separated materials uncertain; ▪ Widespread popular opposition; ▪ High capital costs; ▪ High labor cost due to operation of numerous equipment for RDF preparation; ▪ Some landfilling still required; ▪ Physical processing energy consumptive, decreasing net electricity produced and electricity sales revenue; and ▪ Additional facility required to produce RDF.

3.2.1.3 Gasification

Gasification is the partial oxygenation of carbon-based feedstocks to generate syngas. Similar to pyrolysis, except that air or steam is added to promote gasification, forming carbon monoxide, hydrogen, and methane. In a high temperature gasification process, ash is converted to molten slag, which is subsequently quenched. Syngas can be used for power generation or as a feedstock for synthetic fuels or chemicals.

The use of gasification technology began in the 1970s with capacities of less than 10 tpd, of which none are still operating. The use of unprocessed MSW resulted in many mechanical issues with frequent shut downs and scaling up capacities were not successful. Since the 1990s, methods of MSW pretreatment and production of RDF have reduced reactor problems. Fluidized bed reactors have also become more common, which allow for use of relatively lower temperatures (1,300° F to 1,400° F) and use of more readily available construction materials. Despite improvements in the industry, and various vendors operating globally, the use of gasification for MSW has not been demonstrated on a commercial scale outside of Japan, which has the highest landfill tipping fees in the world.

One of the leading waste gasification plant manufacturers are Nippon Steel Engineering, primarily operating in Japan. Reportedly the Shin-Moji Plant in Kitakyushu City, Japan, which is presented in **Picture 5**, has a capacity of up to 30 tons per hour (tph) and has been operating since 2007. In 2009, the Narumi Plant in Nagoya City, Japan began operation for co-gasification of bottom ash and MSW. The most recent waste gasification plant in operation by Nippon Steel is the Kitanagoya Plant commissioned in 2020, which claims to have a capacity up to 28 tph[13]. Nippon Steel operates multiple plants with capacities ranging from 10,000 to 230,000 tons per year (tpy) and have scaled up some of their facilities to increase capacity.

[13] https://www.hzi-steinmueller.com/wp-content/uploads/downloads/broschure-waste-gasification-en.pdf

Picture 5. Shin Moji Incineration Facility in Kitakyushu by IGES

The Canada based company, Enerkem, has a 25-year agreement with the City of Edmonton in Alberta, Canada to process more than 100,000 tons of waste per year. The Enerkem Alberta Biofuels plant, which is presented in **Picture 6**, generates 10 million gallons per year of methanol and ethanol. The facility is expected to allow the City of Edmonton to reach a 90% diversion rate of residential waste[14]. The facility processes sorted MSW and biomass. The MSW is sorted by removing carbon-based materials and recyclables, leaving dirty cardboard, plastics, Styrofoam, and anything else besides metal[15]. The sorted MSW is dried and transported to the facility for gasification.

Picture 6. Enerkem Alberta Biofuels Facility by Enerkem

In Florida, a private gasification facility, known as the Indian River BioEnergy Center, was commissioned in Vero Beach with the intent of using yard waste to produce ethanol commercially. The facility was constructed and operated by INOES with funding by the U.S. Department of Energy (DOE) and more than $120 million in taxpayer subsidies[16]. In 2017, the Indian River BioEnergy Center closed, reportedly due to multiple technical problems following years of inconsistent production. In a report published by the U.S. DOE in 2016, problems included greater than predicted moisture in wood feedstock that diluted the syngas and various equipment and power failures.

[14] https://www.ourenergypolicy.org/wp-content/uploads/2014/07/alternative.pdf
[15] https://edmontonjournal.com/business/local-business/five-minutes-from-trash-to-ethanol-edmontons-long-delayed-enerkem-plant-explained
[16] https://www.tcpalm.com/story/news/2017/01/17/ineos-closes-vero-beach-biofuel-plant/96412616/

A process flow diagram for gasification facilities is presented in **Figure 3**, which is followed by **Table 9**, which presents a summary of attributes associated with gasification thermal conversion.

Figure 3. Process Flow Diagram for Gasification (typical)

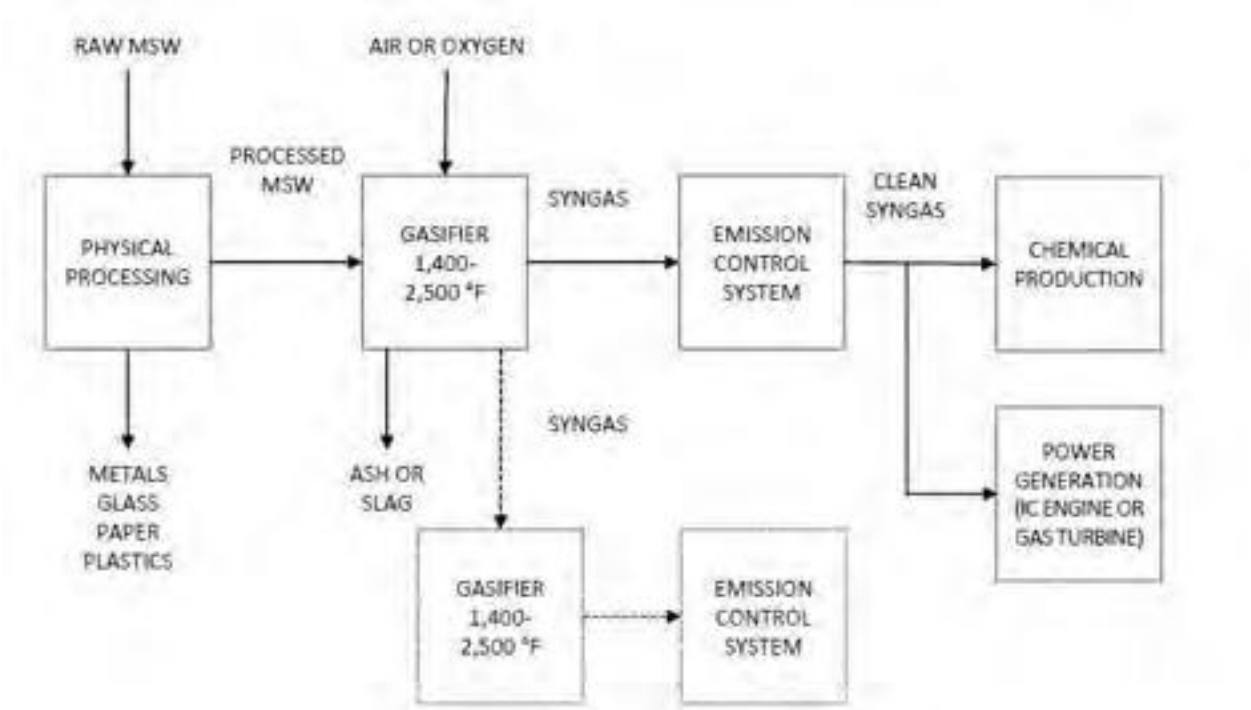


Table 9. Attribute Summary for Gasification

Status	Emerging
Location(s)	Japan and Canada
Typical Tipping Fee Range	Unknown
Processing Capacity	<300 tpd[1]
Pros	▪ Byproducts may have significant reuse potential such as syngas or liquids (light petroleum oils); ▪ High temperature gasification yields residue materials which have significant beneficial reuse; and ▪ Can be combined with other technologies (e.g., pyrolysis, plasma arc) to increase processing capabilities.
Cons	▪ Gasification was attempted during the early 1980s, but failed due to operational difficulties associated with the heterogeneity of MSW feedstocks; ▪ Constant delays in the construction of facilities – Hampden, Maine

	▪ Requires significant pre-processing to remove inorganic materials; ▪ Some landfilling still required; ▪ Syngas byproduct may require steps to remove impurities. These steps produce air emissions and solid residues; ▪ Often includes shredding, screening, air classifiers, drying, and ferrous and non-ferrous metal removal; and ▪ While high temperature gasification has shown technical success, it is very expensive (capital and O&M costs).

[1]Based on Edmonton waste capacity.

3.2.1.4 Pyrolysis

Pyrolysis is an endothermic process that requires a source of heat to initiate the thermal reaction. These systems typically use drums, kiln structures, or tubes, which are externally heated in an oxygen free system. Pyrolysis systems operate at a range of temperatures between 750° F and 1,650° F depending on the feedstock and desired byproducts. At higher temperatures, syngas is produced and is potentially reusable as a combustion fuel or as a heat source for the pyrolytic process. At lower temperatures, liquids or oils are more readily produced.

Recently in the U.S., efforts are being made to scale pyrolysis by a company based in California[17]. The first project is a facility in Vermont expected to start operations in early 2024. Their focus is currently small- and mid-sized projects with biomass feedstocks.

A process flow diagram for pyrolysis facilities is presented in **Figure 4**, which is followed by **Table 10**, which presents a summary of attributes associated with pyrolysis thermal conversion.

[17] Clean Energy Technologies, newly public, is working to scale pyrolysis in the United States | Waste Dive

Figure 4. Process Flow Diagram for Pyrolysis (typical)

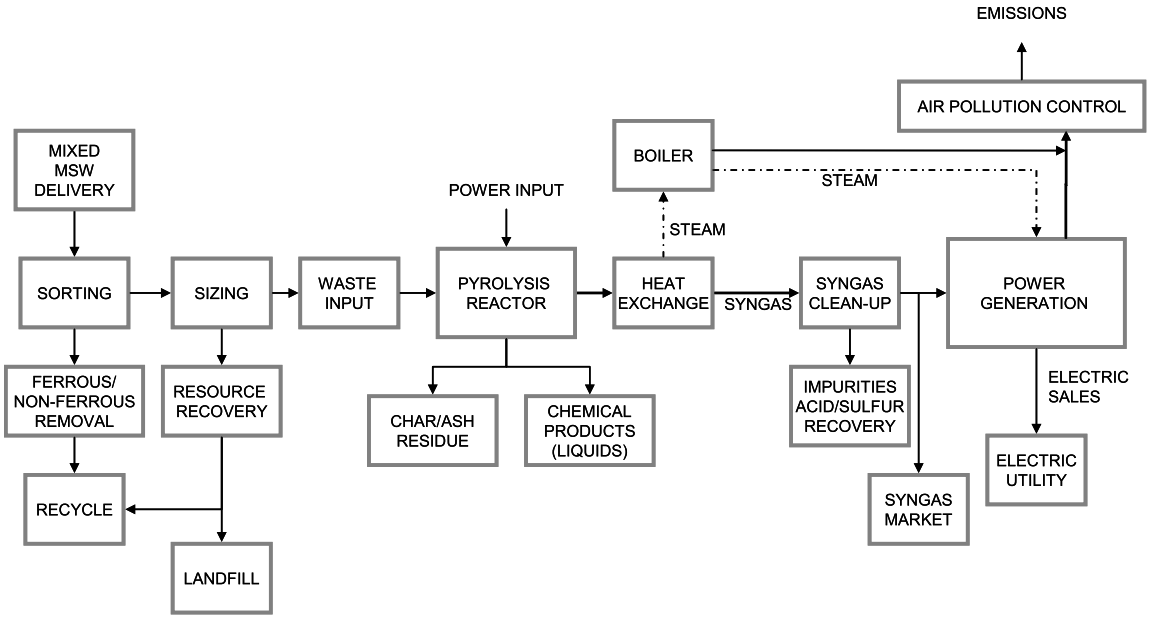


Table 10. Attribute Summary for Pyrolysis

Status	Emerging
Location(s)	Wisconsin, Finland, and Canada
Typical Tipping Fee Range	Unknown
Processing Capacity	<50 tpd
Pros	▪ Byproducts may have significant reuse potential such as syngas or liquids (light petroleum oils); and ▪ Can potentially handle mixed MSW.
Cons	▪ Heterogeneity of MSW feedstock presents problems in desired byproducts; ▪ Requires some pre-processing of MSW feedstock; ▪ The need to remove the char or solid residuals after cooling may interrupt the pyrolytic process and negatively impact operational efficiencies; ▪ Some landfilling still required; if the carbonaceous char is not allowed to be landfilled, char gasification may be required; ▪ Important to render MSW feedstock to a homogenous organic mixture; ▪ Important to remove all inorganic materials (glass or grit) from the feedstock because the inorganic fraction consumes energy; and ▪ Syngas byproduct may require steps to remove impurities. These steps produce air emissions and solid residues

3.2.1.5 Plasma Arc

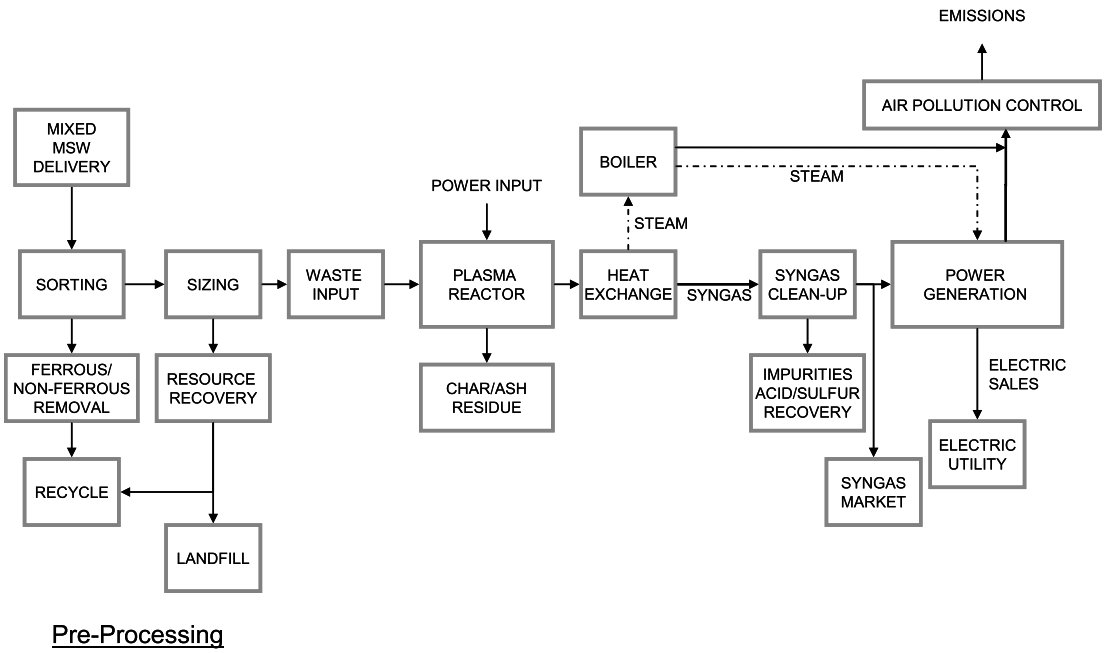
Plasma arc converts select waste streams to slag. The plasma arc system uses electrical current between two electrodes (the arc) to heat a gas (usually air, oxygen, nitrogen, argon, or a combination) to temperatures of tens of thousands of degrees Fahrenheit within the plasma reactor. The heated and ionized plasma gas is then used to treat the feedstock. Coke and lime are often added to the reactor to provide a more reducing atmosphere and to stabilize the slag. Byproducts include syngas and slag.

The use of plasma arc can achieve high levels of material volume reduction, however, achieving the high temperatures for operation require high power needs. The intensive nature of the process also leads to frequent replacement of parts as they are spent and eroded. Operation and maintenance costs can be expensive and the repairs can require specialized experts that may not be readily available, which can potentially cause long shut downs.

Current applications are limited to small-scale plants, some even constructed as transportable systems. The technology in North America is primarily used for small communities or military bases. In Boston, the company Ze-Gen, invested in plasma technologies. However, there was opposition to a proposed plant in Attleboro, Massachusetts, and in 2011, the company stopped its development efforts[18].

A process flow diagram for plasma arc facilities is presented in **Figure 5**, which is followed by **Table 11**, which presents a summary of attributes associated with plasma arc thermal conversion.

Figure 5. Process Flow Diagram for Plasma Arc (typical)



[18] https://www.thesunchronicle.com/news/ze-gen-drops-plans/article_58a44eec-a6b8-5c0a-a3b6-182079c01a35.html

Table 11. Attribute Summary for Plasma Arc

Status	Developing
Location(s)	Japan and China
Typical Tipping Fee Range	Unknown for MSW
Processing Capacity	Unknown
Pros	▪ Syngas byproduct can be used as a fuel or discharged to a boiler for steam production/energy recovery; and ▪ Vitrified slag byproduct may be reusable depending on market availability
Cons	▪ Use of plasma arc has not been commercially demonstrated for MSW processing; ▪ Some landfilling still required for ash residue; ▪ Market for byproducts unstable or untested; and ▪ High capital and operating costs.

3.2.1.6 Plasma Arc / Gasification

Plasma arc / gasification includes plasma as the initial step with the solid residue discharged to a gasification reactor. The molten residue from the gasification process is typically discharged to a water bath and quenched to form a glassy, slag material. The syngas produced can be used as a heat source to be processed through a boiler for steam generation and electricity production or as a fuel. Plasma arc gasification can treat hazardous and medical wastes as well as MSW. In the process diagram, multiple potential streams of revenue are shown that include tipping fee for waste, sale of syngas, and electricity sale.

The process is able to effectively achieve a high level of destruction and waste reduction; however, there are still residues that would require disposal. Depending on the processing and power generation utilized, the volume of residues can vary. Commercial use is typically limited to feedstock of biomass, hazardous, or medical wastes. The facilities currently in use can process up to 100 tpd.

Large scale commercial plants have not proven to be successful. Although several attempts have been made and were cancelled during the design and permitting phase and /or after experiencing technical issues during the construction phase. In 2016, the construction of two (2) adjacent plasma arc gasification plants in Tees Valley, United Kingdom, was cancelled[19]. Each facility was designed to process 1,000 tpd, and it is estimated that the first facility had cost about $500 million to construct. During the final stages of commissioning the first facility, it was determined that additional design and operational changes would be required prior to commissioning. The company decided not to continue construction due to the estimated additional time and costs.

In Japan, several plasma arc gasification facilities have been constructed and were successful. In 1999, a pilot plant was constructed in Yoshii, Japan, with a capacity of 150 tpd. The plant was decommissioned after the pilot program ended in 2004. In 2002, a plant with the same MSW

[19] Air Products shuts down Tees Valley development | Resource.co

capacity was constructed in Utashinai City; however, it was closed in 2013. Reportedly the plant was closed due to increases in recycling efforts that reduced the MSW supply to the plant[20].

A process flow diagram for plasma arc/ gasification facilities is presented in **Figure 6**, which is followed by **Table 12**, which presents a summary of attributes associated with plasma arc/ gasification thermal conversion.

Figure 6. Process Flow Diagram for Plasma Arc / Gasification (typical)

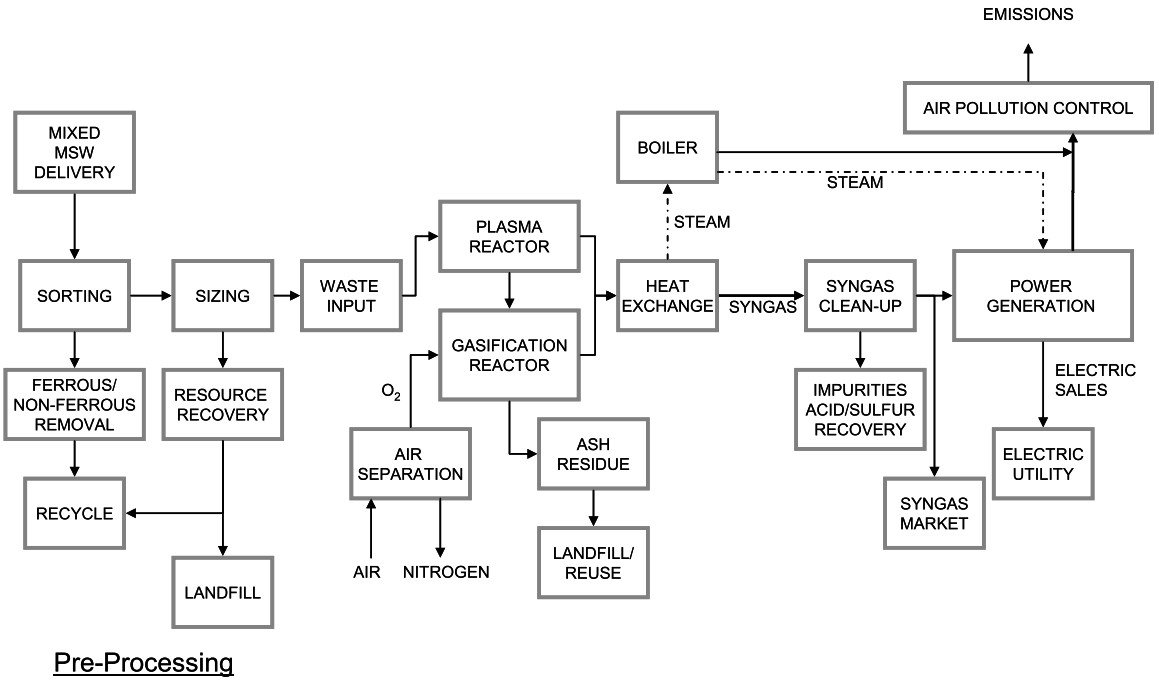


Table 12. Attribute Summary for Plasma Arc / Gasification

Status	Developing
Location(s)	United States, Canada, Japan, Italy, India, China, and Spain
Typical Tipping Fee Range	Unknown for MSW
Processing Capacity	<200 tpd
Pros	▪ The process' thermal efficiency is attractive in continuous feed systems; and ▪ Effectively treats some hazardous and medical wastes as well as mixed MSW.
Cons	▪ Energy consumptive and expensive to operate; ▪ Project economics are largely dependent on the systems revenues to offset operational costs; ▪ Some landfilling still required;

[20] http://energy.cleartheair.org.hk/?p=1851

	▪ Requires some form of preprocessing; ▪ Technology unproven for processing mixed MSW at this point; ▪ High capital and operating costs; and ▪ Market for byproducts unstable or unknown.

3.2.1.7 Pyrolysis/Gasification

Pyrolysis can be supplemented by gasification to further process and recover energy from the Pyrolysis residues. Pyrolysis is the initial step with the char or solid residue discharged into a gasification reactor. The liquid residue from the gasification process is typically discharged to a water bath and quenched to form a glassy, slag material. The off-gas from this process can be used as a heat source to be processed through a boiler for steam generation and electricity production or as fuel or syngas.

A process flow diagram for pyrolysis / gasification facilities is presented in **Figure 7**, which is followed by **Table 13**, which presents a summary of attributes associated with pyrolysis / gasification thermal conversion.

Figure 7. Process Flow Diagram for Pyrolysis / Gasification (typical)

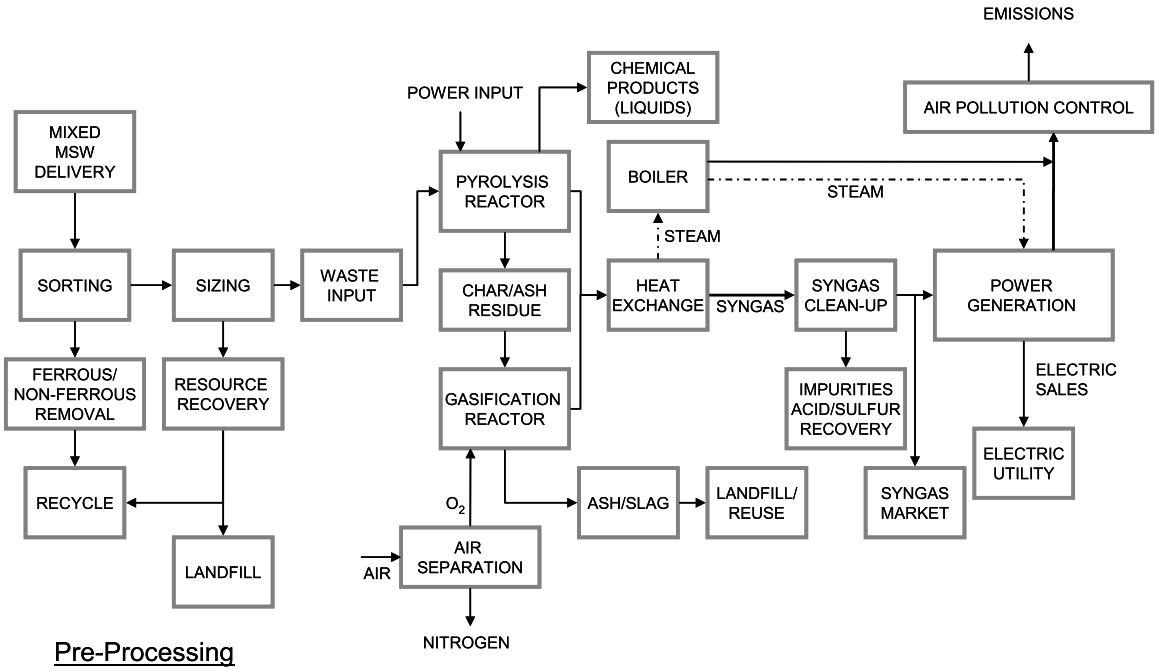


Table 14. Attribute Summary for Pyrolysis / Gasification

Status	Developing
Location(s)	Germany
Typical Tipping Fee Range	$50 - $125+
Processing Capacity	~240 tpd
Pros	▪ Byproducts may have significant reuse potential such as syngas or liquids (light petroleum oils).
Cons	▪ Heterogeneity of MSW feedstock presents problems in desired byproducts; ▪ Requires some pre-processing of MSW feedstock; ▪ The need to remove the char or solid residuals after cooling may interrupt the pyrolytic process and negatively impact operational efficiencies; ▪ Some landfilling still required; ▪ Important to render MSW feedstock to a homogenous organic mixture; ▪ Important to remove all inorganic materials (glass or grit) from the feedstock because the inorganic fraction consumes energy; and ▪ Syngas byproduct may require steps to remove impurities. These steps produce air emissions and solid residues.

3.3 COMPOSTING AND DIGESTION-SOURCE SEPARATED ORGANICS

Composting and anaerobic digestion represent two key methods for recycling organic waste, each utilizing distinct processes to manage organic materials and produce valuable end-products.

Composting is a natural, aerobic process that transforms organic matter—such as food scraps, yard waste, and leaves—into a nutrient-rich soil amendment. This process relies on microorganisms to decompose organic materials in the presence of oxygen, resulting in compost. This valuable end-product can be used to enrich soil and support plant growth, reduce waste sent to landfills, and mitigate greenhouse gas emissions by diverting organic waste from landfill disposal.

Anaerobic digestion, in contrast, occurs in an oxygen-free (anaerobic) environment. This process breaks down organic waste into biogas, primarily composed of methane, which can be purified and refined into renewable natural gas. Anaerobic digestion not only offers an alternative energy source but also diverts organic waste from landfills, reducing GHG emissions and contributing to a more sustainable waste management system.

Mulch Colorization Facilities have become relatively common over the last 25 years as composters and producers of soil amendments have successfully implemented value added approaches to increasing their marketplace for recycled organic materials. There are several equipment providers who supplier colorizing equipment that enables hundreds of thousands of additional tons to be

marketed. Overall, the 2024 annual sales for mulch were nearly $100 M nationally and its growth is expected to continue for the next twenty years at a rate of 7% or greater annually.

3.4 RECENT TRENDS AND TECHNOLOGICAL ADVANCEMENTS IN ORGANICS MANAGEMENT

Technological innovation is driving advancements in the processing of organic waste, improving efficiency, scalability, and the environmental performance of composting and anaerobic digestion systems. These advances include innovations in feedstock preparation, process optimization, and end-product quality. **Table 14** presents some of the latest technological developments, their timelines, and their applicability to managing source-separated organics. While the option identified in **Table 14** focus on larger scale approaches, the Task 4 White Paper identifies options for backyard composting as well as community-based composting opportunities.

Table 15. Organics Management Technology Overview

TECHNOLOGY	TYPE	DESCRIPTION	TIME TO FINISHED PRODUCT	APPLICABILITY TO SOURCE-SEPARATED ORGANICS
Depackager	Screw Press/ Vortex/Paddles/ Pulper/Hammer/ Screens	Various technologies are used to separate the organic and inorganic fractions of food waste and the associated packaging.	N/A	Front end technology to improve feedstock quality.
Windrowing	Outdoor open air	Organic material is mixed and formed into long rows. Material is periodically turned and mixed.	3-9 months	Commonly used for agricultural and yard waste, best suited for low amounts of food waste (<15%). Simple and lower cost to implement but require more area for piles and labor for turning which is required to maintain sufficiently high temperatures to destroy pathogens. Turning piles can release odors so "best practices" for odor and vector prevention need to be followed.
Aerated Static Pile (ASP) with biofiltration or Covered Aerated Static Piles (CASP)	Outdoor or indoor, System	Organic materials are placed in static piles and. Air is forced (either up or drawn down) through the piles using blowers to maintain microbial activity, reducing the need for turning.	4-6 weeks	ASP allows for faster degradation and requires less area. Popular for food and organic waste processing. Food waste and yard waste are combined with a bulking agent (wood chips) as needed to balance the carbon-to-nitrogen ratio

TECHNOLOGY	TYPE	DESCRIPTION	TIME TO FINISHED PRODUCT	APPLICABILITY TO SOURCE-SEPARATED ORGANICS
		Biofiltration can be provided by a layer of carbonaceous material, such as wood chips or compost, on top of the piles or a semi-permeable fabric cover can be used. Both increase efficiency by trapping heat and moisture and reduce odors and limit attraction of vectors.		(C: N). Follow "best practices" for most efficient breakdown. ASP systems are often used in large-scale and MSW composting applications because of breakdown efficiency with biofiltration or CASP used to limit odor, VOC and other airborne pollutants.
In-Vessel Composting	Outdoor or indoor, System	Organic material is fed into a "vessel", often a barrel, drum or trench, where it is agitated, rotated or otherwise turned until initial decomposition has occurred. Can be batched or continuously fed.	1-3 weeks	Offers a controlled environment, low space, efficient and rapid degradation. A significant curing period is usually required for full organic stabilization. Common in industrial applications, it accommodates animal products. Contamination can be a problem because pre-processing often includes size reduction, thereby creating difficulties for contamination removal.
Anaerobic Digestion (AD)	Outdoor enclosed anaerobic	Organic material is warmed and mixed in a closed, airtight tank. Microorganisms break down or "digest" organic material without the presence of oxygen, producing biogas, a renewable fuel and a nutrient rich effluent (digestate). Biogas can be used to generate electricity, for combined heat and power or increasingly to produce renewable	15-30 days	Historically, AD was reserved for industrial or commercial food waste recovery. These materials allow for proper "feeding" to maintain process stability. However, digestion of household and institutional food waste and residential SSO is gaining popularity. The process requires low solids content (10-14%) sometimes needing additional dilution. Variability of nutrients, energy content, etc. and reliable supply of

TECHNOLOGY	TYPE	DESCRIPTION	TIME TO FINISHED PRODUCT	APPLICABILITY TO SOURCE-SEPARATED ORGANICS
		natural gas. Financial incentives through the Renewable Fuel Standard and California's Low Carbon Fuel Standard (LCFS) are often available to assist in monetizing this recovery approach.		SSO can create instability in the digestion process. Not a solution for high lignin materials (e.g., yard waste) and compostable food service ware can cause issues. Digestate management can be challenging. Recent concerns are being raised over PFAs content that may impact land application.
Co-Digestion at WWTP	At Wastewater Treatment Plant	Organic waste is added to WWTP digesters with excess capacity. Biogas production can be used to power the treatment process, generate heat and electricity or produce renewable natural gas. Liquid digestate can be reintroduced into the digestion process, dewatered, treated for nutrient recovery and discharged. WWTP capital modifications vary from plant to plant depending on tipping and screening infrastructure needs as well as biogas treatment and utilization requirements.	15-30 days	Ideal for high-energy feedstocks such as fats, oils or greases (FOG) with high biomethane potential, where the wastewater sludge can provide buffering to provide steady PH. Low solids industrial food waste is also well suited. Increasingly SSO is also being co-digested. Not a solution for yard waste or large amounts of lignatious compostables.
Biochar	Outdoor or vessel kiln	Biochar is a carbon rich material produced through pyrolysis: where organic material, such as yard waste, food scraps and other organics are inputs. During the high		Carbonaceous materials are particularly well suited for biochar such as yard waste, disaster debris and food scraps. Solid separated digestate from anaerobic digestion can also be used as biochar feedstock.

TECHNOLOGY	TYPE	DESCRIPTION	TIME TO FINISHED PRODUCT	APPLICABILITY TO SOURCE-SEPARATED ORGANICS
		temperatures, low oxygen process, volatile compounds are released leaving behind a stable form of carbon with a porous structure. The sequestration of the carbon stored in the biochar provides a carbon benefit and can be eligible for carbon offset markets. Biochar has many properties that lend themselves to a variety of applications including soil amendment, filtration, PFAS stabilization and construction material substitution.		Biochar is commonly added (5-10% by volume) to compost to increase its value as a soil amendment. There is evidence to suggest that the pyrolysis process mitigates PFAs risk. The potential for biochar applied as ADC to mitigate methane emissions (through oxidation and/or adsorption) is also being investigated.

These technological advances not only improve the operational efficiency of composting and anaerobic digestion facilities and provide additional revenue stream, but they also support climate goals by reducing greenhouse gas emissions, diverting organic waste from landfills, and generating renewable energy sources. Additionally, improved sorting and processing enhance the quality of end-products, meeting the increasing demand for high-value organic products like premium compost and biogas.

These approaches are especially beneficial for source-separated organics, allowing municipalities and private operators to better capture organic waste streams, improve waste diversion rates, and contribute to circular economy goals. As these innovations become more cost-effective and scalable, they will likely become integral to modern organics management systems.

3.5 BIOGAS FROM ANAEROBIC DIGESTION

Renewable natural gas (RNG) produced through Anaerobic Digestion (AD) offers versatile applications across sectors, supported by favorable economics through carbon credits, offsets, and incentive programs. RNG includes the further refinement of biogas generated through the AD process to remove carbon dioxide and contaminants (i.e., siloxane, hydrogen sulfide, etc.) to produce RNG that is equivalent in heating value to natural gas. RNG can also be liquified to produce liquid natural gas (LNG). The growth of RNG in a carbon-conscious market not only mitigates emissions but also contributes to circular economies by repurposing organic waste into valuable energy resources (Zaghdoudi, 2021). Use pathways for RNG include the following (US EPA, 2024):

- **Electricity off-site-** Early utilization of biogas in the US included a significant portion of electricity generation and grid interconnection, supporting renewable portfolio standards (RPS) and grid decarbonization goals. However, the emergence of more favorable federal and state incentives has ushered a shift to renewable natural gas (RNG).

- **Transportation Fuel** – RNG can be used as fuel, as compressed natural gas (CNG) or liquified natural gas (LNG) in vehicles particularly in heavy-duty applications where electrification is challenging, such as long-haul trucks and buses. RNG utilization helps entities (both public and private) comply with low-carbon fuel standards and GHG reduction targets and reduce tailpipe emissions. Big fleet operators (important to the waste and recycling sector) are adopting RNG. RNG exported to the pipeline can also be utilized for the vehicle fuel market or it can be utilized locally which avoids the need to meet natural gas pipeline specifications (meeting vehicle fuel specifications are often less stringent).

- **Pipeline Injection** - RNG can also be injected into existing natural gas pipelines or dedicated RNG pipelines, helping meet energy demands with renewable energy. The RNG must meet the specifications of the receiving gas utility and can be received at the point of injection by a custom pipeline (virtual pipeline), truck or pipeline extension. Pipeline injections reduce carbon intensity of existing gas supplies, enabling some entities to meet their Renewable Portfolio Standards. Under the Renewable Fuel Standard (RFS) program, upgraded RNG produced from MSW or SSO that is injected into the pipeline can generate D3 Renewable Identification Number (RIN) that can be traded-. Every equivalent gallon of renewable fuels is assigned a RIN at its point of generation or origination. These RINs function similar to the way that renewable energy credits work in the generation and trading of renewable electricity. RINs can be traded between parties, bought as attached RINs to fuel purchased, and/or bought unattached on the open market.

- **Onsite Power and Heat Generation**- Using AD biogas or RNG for in-house electricity requirements or thermal demands enables another pathway to capture value capture. Electricity produced through onsite generation or combined heat and power RNG can directly replace fossil-derived natural gas in WWTP or industrial processes requiring high thermal energy, such as cement, steel production, and chemical manufacturing. Heavy industry is incentivized to switch to low-carbon fuels, and RNG adoption can be supported by subsidies and carbon credits.

3.6 BACK-END RESIDUAL PROCESSING OF SEPARATED ORGANICS FOR BENEFICIAL REUSE (FUEL, SOIL HEALTH, LANDFILL COVER)

Products derived from source-separated composting (aerobic digestion) typically target high-value markets that prioritize superior soil fertility enhancement. Soil markets value compost for its ability to provide essential nutrients, improve water-holding capacity, and promote soil health. Finished materials produced from clean, high-quality, largely uncontaminated feedstocks are especially valuable. While most composting facilities utilize back-end screening devices to remove contaminants and oversized materials, the most important efforts to maintain material cleanliness occur at the point of generation. Users of the system are responsible for removing contaminants—such as plastic bags, paper, and rigid plastics—before they enter the composting mass.

Finished compost products derived from this process are often used as growing media for a variety of applications, including lawns, shrubs, flowers, vegetable gardens, truck farms, and indoor plants. When contamination levels are too high for these uses, it typically indicates a need for improved system user education to ensure proper separation of contaminants at the outset.

The effluent from anaerobic digestion is often separated into digestate solids (about 10%) and liquid digestate (90%). Additional stabilization processes are necessary for the separated digestate solids. Composting is the most common and effective method for achieving this type of stabilization. Liquid digestate, is nutrient rich, containing nitrogen, phosphorus, and potassium and can be used as an organic liquid fertilizer. Land applications of digestate has been a widely practiced method in certain regions for many years. It can also be processed for nutrient recovery to produce concentrated fertilizer products that can be sold.

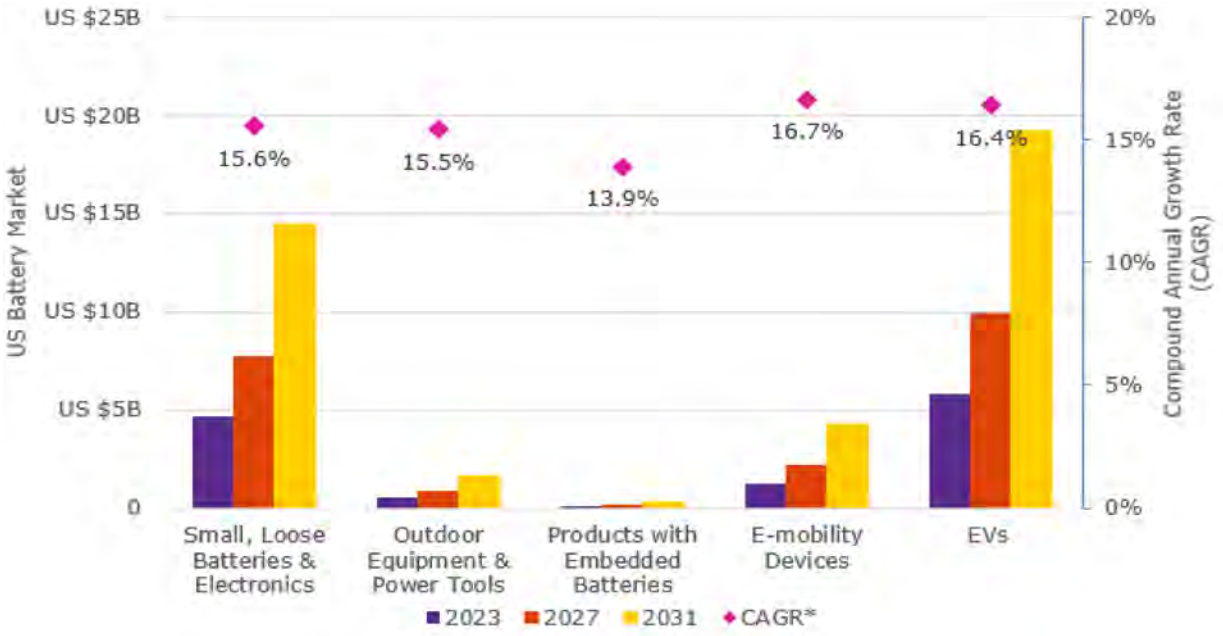
Alternative methods of beneficial reuse — such as utilizing solid digestate as fuel, applying it as landfill cover—are generally considered less advantageous. These methods are typically less economically viable and do not capture the nutrient value contained in the digestate. Thus, the focus remains on utilizing stabilized compost and digestate for their ability to improve soil health, support agricultural productivity, and enhance sustainable resource recovery.

3.7 REDUCING OR IDENTIFYING NEW AND EMERGING BENEFICIAL REUSE OPPORTUNITIES FOR PROCESS RESIDUE

3.7.1 New and Emerging Battery Management Practices and E-Waste Recovery

The rapid growth in battery sales across all sectors reflects the increasing demand driven by technological advancements, consumer preferences, and shifting regulatory and policy requirements. Market analysts project that all battery types addressed in this roadmap will experience an average annual growth rate exceeding 15% over the next seven years, underscoring the ongoing expansion of the production market, technological advancements, consumer demands, and regulatory and policy requirements (Data Bridge Market Research, 2022). **Figure 8** presents the projected marketplace trajectory by battery type.

Figure 8. Marketplace by Battery Type (Data Bridge Market Research, 2022)



** The Compound Annual Growth Rate (CAGR) shown reflects the average projected growth rate from 2023 to 2031, as calculated by Data Bridge Market Research. This figure is based on current market values and future market forecasts.*

The rapid growth in battery sales across all sectors reflects the increasing demand driven by technological advancements, consumer preferences, and shifting regulatory and policy requirements. Market analysts project that all battery types addressed in this roadmap will experience an average annual growth rate exceeding 15% over the next seven years, underscoring the ongoing expansion of the production market and innovation in battery technologies (Data Bridge Market Research, 2022).

However, improper handling and disposal of batteries—regardless of type—pose significant environmental and safety risks. Each year, approximately 5,000 fires are reported at Material Recovery Facilities (MRFs) due to mishandled lithium-ion batteries. These incidents result in worker injuries, facility shutdowns, damage to recycling equipment, increased insurance premiums (with rates rising by as much as 5,000%), and financial losses (NWRA, 2024). Such statistics highlight the critical need for improved battery management practices and the implementation of comprehensive recycling strategies.

To address these challenges, recycling systems must focus on proactive solutions, including the development of new and emerging battery management and e-waste recovery technologies. Innovations such as advanced sorting mechanisms, AI-driven identification tools, and improved collection infrastructure can enhance the recovery rates of lithium-ion and other battery types while minimizing safety risks. Additionally, expanded awareness and education programs targeting consumers and MRF operators are essential for ensuring proper recycling and handling of used batteries.

E-waste recovery represents another critical opportunity. As the volume of discarded electronic devices continues to rise—spanning smartphones, laptops, electric vehicles, and other battery-

dependent technologies—systems that incorporate effective recycling methods for e-waste can reduce landfill burdens and recover valuable resources. Emerging battery recycling technologies, such as hydrometallurgical and direct recycling methods, are being deployed to improve recovery rates for critical metals, including lithium, cobalt, and nickel, which are essential for battery manufacturing.

Furthermore, regulatory efforts, including extended producer responsibility (EPR) programs and policies designed to incentivize battery recycling, are creating pathways for systemic change. These strategies can align financial responsibility with battery manufacturers and encourage innovative design improvements, such as the development of modular battery designs and improved product longevity.

Ultimately, while improperly managed batteries and e-waste pose environmental and operational risks, the expansion of technological advancements and strategic recycling opportunities can turn these challenges into avenues for resource recovery and innovation. Coordinated efforts across policy, technological development, and public awareness will be essential for improving both battery management practices and e-waste recovery systems.

3.7.2 Textile Recovery Optimization

In the area of textile recovery, the application of technology is one of the components needed to bridge the sorting-for-recycling infrastructure gap. It is worth highlighting that the textile sorting and grading industry is largely exported and the Authority's location in Southern Florida, with its proximity to ports, is especially well suited to building textile sorting capacity. The region plays a significant role in the secondhand textiles trade due to its strategic geographic location as a gateway to Latin America and the Caribbean, robust shipping infrastructure, and established aggregation and brokerage market for secondhand textiles.

Sorting technology solutions range from handheld and table-top Near-Infrared (NIR) devices to industrial scale sorting lines using hyperspectral imaging, artificial intelligence (AI), image recognition, and machine learning to make the sorting process quick, efficient, and accurate to meet end market requirements for recycling. The aim of these technologies is to sort non-reusable textiles by fiber type for recycling end markets. Technology tailored for reuse sorting is nascent but expected to develop quickly. Projects like Fashion for Good's Rewear Project tests automated sorting technologies using machine learning and artificial intelligence (AI) to identify color, style, garment type, and quality to enable more efficient sorting for reuse. Established equipment manufacturers and technology companies currently exploring automated sorting for textile recycling include Tomra Textiles, Valvan Baling Systems, Pellenc, PicVisa, Andritz, and Trinimax. Furthermore, there are many new startups, such as Matoha, Sortile, Refiberd, circular.fashion, and HKRITA Sorting that are testing means to identify specific fiber types, detect color, remove disruptors (metal detection), and reduce textile sizes.

Digital product passports and digital IDs are another area of innovation and interest in the textile reuse and recycling sector and their use is soon to be required in new products in the EU. However, questions remain about how widely brands will adopt digital IDs, the variety of hardware solutions that will be deployed, which information will be housed in the passport, and how the industry will integrate digital readers in the sorting process.

Automated sorting technology is being piloted in select US-based textile sorting facilities. Receptivity to this technology may increase with the passage of textile EPR laws like the one passed in 2024 in California. However, capital cost and unit economics remain a hurdle.

Assuming most of Broward's textile waste is from the post-consumer segment of the supply chain, most of what is collected would be for domestic resale and/or exported. To date, textile recyclers require controlled feedstock streams like post-industrial offcuts with known compositions to hone their technologies rather than post-consumer materials, that are much more varied and complex. This is expected to continue given chemical recyclers are mostly still at lab scale and focused on testing, proving, and developing their technical capabilities.

3.8 ADVANCED RECOVERY SYSTEMS FOR GASSES, ASH OUTPUT, BIOLOGICAL DIGESTION, ETC.

3.8.1 Advanced Recovery Systems for Gasses

This section on advanced recovery systems for gasses is focused on recovery of GHG, otherwise known as carbon capture. The U.S. EPA determined that WTE facilities inherently reduce GHG emissions due to their diversion of methane-generating waste from landfills and offset fossil fuel usage due to the energy produced (Kaplan et al., 2009). In addition, further GHG reductions may be realized depending on the distance to landfills and the reduction in waste transport-related GHG generation using fossil fuels. However, since WTE facilities do still emit carbon dioxide, further advanced recovery systems for carbon capture are being developed, pilot-tested, and advanced for potential full-scale operation, similar to the trends in the fossil fuel power generation facilities industry.

The following represent two methodologies for advanced recovery of gasses (carbon capture):

- Post-combustion carbon capture from flue gas.
- Direct air carbon capture for use as an offset.

3.8.1.1 Post-Combustion Carbon Capture from Flue Gas

The first methodology involves removing and sequestering flue gas CO_2 at the WTE facility directly from the flue gas stream prior to emission to the atmosphere. This is typically done by intercepting or performing a slipstream and sectioning off a portion of the flue gas prior to the stack. The flue gas is run across a series of chemicals to remove GHG from the gasses prior to reintroduction back to the stack for emissions. The most common removal technology involves amine stripping to remove the GHG from the gas stream. Additional steps are needed to remove the GHG from the amine stream so that the GHG can be re-used at an available market or sequestered.

The following represents some existing or planned post-combustion carbon capture technologies projects that remove CO_2 from the flue gas of a WTE facility:

- AVR WTE Facility (Duiven, Netherlands) - The Duiven facility CO_2 capture plant commenced operation in August 2019 with the first commercial supply of CO_2 to partner Air Liquide (SWANA ARF, 2023).
- Twence Holding Plant (Netherlands) - In 2014, Twence began operating the world's first system to capture CO_2 from a waste-to-energy plant. In 2022, Twence began building a modular carbon capture plant to clean flue gases at its Hengelo WTE Facility (SWANA ARF, 2023).
- Filbornaverket, a waste-fired combined heat and power (CHP) plant (Helsinborg, Sweden)

- The Öresundskraft AB's Innozhero carbon capture and storage (CCS) project in Helsinborg, Sweden, will receive 54 million euro in funding from the European Union (EU) with plans to be operational by 2026 (Sherrard, 2024).
- Herambiente Ferrara WTE Plant in Italy – Saipem's Bluenzyme technology will be used at this facility for carbon capture as a first of its kind in Italy for a WTE facility (SAIPEM, 2024).
- Klemstrud WTE CHP, Norway - City of Oslo and Fortum Oslo Varme entered into an agreement to ensure full financing of a carbon capture plant at Klemetsrud, which is scheduled for commercial operation in 2026 (Les pressemeldingen på norsk, 2022).
- Reworld Hillsborough, Hillsborough County, FL – The County partnered with a South Korean firm, LowCarbon, in 2024 to conduct a 60-day pilot to capture one (1) ton of CO_2 daily out of the 600 tons emitted daily from the flue gas stream and convert it to calcium carbonate powder, which could then be marketed for construction products. The pilot cost was covered by LowCarbon and was successful. The County, however, has chosen not to continue with further collections due to the $25 million price tag to install a larger unit that could capture somewhere between 100 and 400 tons of CO_2 per day (Prator, 2024).

3.8.1.2 Direct Air Carbon Capture for Use as an Offset

The second methodology involves removing atmospheric CO_2 at a facility directly from the atmosphere via large fans that pull atmospheric air into the process. The atmospheric air is run across a series of chemicals to remove GHG from the air prior to reintroduction back to the atmosphere. The most common removal technology involves amine stripping to remove the GHG from the air. Additional steps are needed to remove the GHG from the amine stream so that the GHG can be re-used at an available market or sequestered.

While there are no direct air capture facilities currently in use with WTE facilities, several direct air capture (DAC) pilot facilities have been demonstrated such as the Carbon Engineering, also called 1PointFive, facility in Vancouver, Canada for CO_2 removal from air. The air-cleaning technology would be housed and powered directly onsite and used to directly offset flue gas GHG emissions in lieu of direct flue gas cleaning, which is considerably more complicated. The calcium carbonate tablets produced in a DAC system such as the Vancouver technology are removed and could either be sold as a revenue stream or directly sequestered if needed to comply with regulations.

Multiple commercial examples of DAC are currently under construction in the U.S. and abroad and the U.S. Department of Energy (DOE) is currently providing funding assistance for several distinct technologies to perform DAC. Two (2) examples of DOE-funded DAC facilities are Project Cypress, a Climeworks Corporation and Heirloom Carbon Technologies project in Louisiana, and the South Texas DAC Hub, a 1PointFive project in Kleberg County, TX. Neither facility is commercial yet, but both vendors have functional pilot-scale DAC facilities in other locations (USDOE, 2023).

Direct air capture facilities have been demonstrated such as in Vancouver, Canada for CO_2 removal from air. The air-cleaning technology would be housed and powered directly onsite and used to directly offset flue gas GHG emissions in lieu of direct flue gas cleaning, which is considerably more complicated. The calcium carbonate tablets produced in a DAC system such as the Vancouver technology are removed and could either be sold as a revenue stream or directly sequestered if needed to comply with regulations.

3.9 STATE-OF-THE-ART ASH MANAGEMENT

Modern WTE facilities employ advanced ash management strategies to enhance environmental sustainability and resource recovery. Ash is a substantial fraction, typically between 15% – 25% by weight of incoming MSW in a WTE setting. Without metals recovery or beneficial ash reuse, this ash is disposed of in landfills typically. Therefore, modern WTE facilities use the following approaches to employ advanced ash management strategies:

Enhanced Metal Recovery - Advanced technologies enable the extraction of both ferrous and non-ferrous metals from bottom ash. Typical modern WTE Facility metal recovery technologies recover 85 to 90% or more of the metals in the ash stream. Some WTE Facilities further process their bottom ash to remove even smaller sized metal particles.

Beneficial Reuse of Bottom Ash - Processed bottom ash can be repurposed as construction aggregate, particularly in road construction. Where allowed, overall waste diversion by processed through a WTE facility with beneficial reuse of bottom ash can approach 94% or more by weight of the incoming waste stream.

Separate Management of Fly Ash - Managing fly ash separately from bottom ash, enables facilities to increase metals recovery and recovered metals sales revenues and supports the beneficial reuse of bottom ash. The remaining fly ash continues to be treated and stabilized with a smaller portion of the bottom ash stream to reduce fly ash hazardous characteristics, facilitating safer disposal.

3.10 ADVANCED MIXED WASTE PROCESSING EVALUATION

Significant advancements in advanced mixed waste processing have emerged over the past 24 months, showcasing promising improvements in addressing the historically low diversion rates associated with traditional mixed waste sorting technologies. Notable developments include the RDS MWPF in Chesapeake, Virginia, and the proof-of-concept plant for Koch Industries' Juno technology in Toledo, Oregon. Additionally, several back-end in-vessel wet and dry digestion facilities, designed to operate post-conventional MWPF sorting for recyclables, are either operational or under construction. These innovations demonstrate enhanced capabilities and potential for optimizing waste diversion and resource recovery processes, marking a substantial step forward in sustainable waste management practices.

However, the failure rate of mixed waste facilities before their planned contract or depreciation periods is still above 80%, and almost none are operating as intended in their design. They are expensive to build and operate and are not yet sustainable in low landfill tip fee, unregulated market environments. In addition, MWPFs are never sustained from commodity sales. In the last 60 years, hundreds of such facilities have been briefly operated then closed. Some do stay in operation because of their flexibility to revert to more source separated recyclables processing or other source separated feedstock (i.e., engineered fuel). In addition, they will proliferate in high tip fee markets, like those in the European Union, that allows the needed processing fee to cover the cost of operations and disposal but are increasingly expensive for every point of diversion they deliver. Other facilities continue to sustain operations in highly regulated environments where diversion of solid waste is mandated for public or private solid waste collectors to provide. For instance, much of the installed operating fleet in North America is in the regulated state of California with a 75% diversion law that is enforced.

The following sections and tables provide a thumbnail description of the state of play of MWPFs and are the result of a high-level survey of a large sample of advanced waste options in North America.

Values for each field were obtained from public research. Each facility is classified as still operating, recently closed or cancelled, or 'in-construction'. Where the availability of data was not available for a certain criterion, either a professional judgement estimate is offered, or the criteria is not inputted.

3.10.1 Advanced Mixed Waste Processing Technologies- Current North American Fleet Description and Metrics

Table 15 presents the functional and operational key metrics that were used to evaluate the advanced mixed waste facilities in North America, which are presented in Table 16.

Table 16. Advanced Mixed Waste Technology Evaluative Criteria

CRITERIA	DEFINITION	EVALUATION APPROACH	SCORING METHOD
Operational Experience/ Past Performance	Extent that it has successfully been operated in other markets	Review operation through literature and/or outreach to operators and related jurisdictions.	**Very Low** unproven, demonstrated only at bench scale. **Low** proven at small commercial scale <2 yrs **Medium** proven at small commercial scale >3 yrs **High** proven operations for ≥3 yrs
Economic / Operational Risk	Evidence of failure, default or unintended operational approach	Review literature and/or outreach to operators and related jurisdictions. Score based on professional judgement.	**Low -** Proven operational history with two or more plants at scale in North America. Authority should consider further investigation. **Medium –** Operational history with one plant at scale in North America **Unacceptable -** No commercial history of operations or failed facilities
Diversion	% of MSW diverted from landfill	Review data on diversion % through literature or outreach to operators. Audited performance by third-party.	**Percent Diverted** (MSW Stream) - Needs to be verified by third-party audit
End Use	Qualitative evaluation of Potential for use (follows Waste Hierarchy principles): • Reuse • Mechanical Recycling / Composting • AD	Review data about recovered material end use/markets through literature, outreach to operators and/or internal knowledge. Segregated by material groups (organics, plastics, metals, fiber, other). Assumptions will be required; score will be based on professional judgement.	**Low -** No beneficial reuse documented **Medium -** Beneficial reuse document, but instances of criteria contamination identified **High -** Resulting product useful for combustion or ADC only

	• Chemical Recycling • Mixed Waste composting for mass reduction • Engineered Fuel/WTE • Landfill		

Table 17. Advanced Mixed Waste Technology Evaluation

FACILITY NAME	STATE	STATUS	TECHNOLOGY	TYPE	OPERATIONAL EXPERIENCE/ PAST PERFORMANCE	ECONOMIC/ OPERATIONAL RISK	DIVERSION	END USE
Anaergia/ WM **Sun Valley Recycling Park and Rialto AD**	CA	Operating	Commercial Franchise-front end recycling of rigid containers and some OCC. Organics conditioning and delivery to wet, in-vessel anaerobic digestor & water reclamation	MSW-RNG	**Low** Although it has some continuous operations. Anaergia has had financial difficulties caused by low process fees from low-priced contracts.	**Medium to High** due to continued financial performance	**60-90%** of organics received from Municipal Solid Waste (38% of MSW stream) if digestate is permitted for cover. Even without beneficial re-use of digestate, technology is promising for backend recovery of ~40% of organics in mixed waste.	**Low Risk – Recyclables and RNG** Recover Recyclables (WM markets material). Electricity, natural gas. **Medium Risk - Digestate** Use of digestate for enriched land application highly dependent on emerging PFAS and micro-plastic regulation
Athens Sun Valley	CA	Rumors about adding organics solution to process MWPF, not announced or verified	Front end MWPF	MWPF	**Very Low** Converted to heavy duty commercial Single Stream operations with bag breaker	**Low** Required for commercial franchise and SB 54 compliance. Athens will use new MWPF in-construction to meet commercial	**<20%** before any organics processing (None yet installed)	**Low Risk** Recycled commodities

FACILITY NAME	STATE	STATUS	TECHNOLOGY	TYPE	OPERATIONAL EXPERIENCE/ PAST PERFORMANCE	ECONOMIC/ OPERATIONAL RISK	DIVERSION	END USE
						franchise but processes single stream very successfully		
Medina County	OH	Operating	Front End, simple MWPF for commercial and drop off/ contaminated Single Stream recyclables at transfer station	MWPF	**Medium** - operational for six years	**Medium** - insufficient commercial/industrial material forced contract renegotiation of the contract and the need to supplement flow with single stream. Other Rumpke facilities single stream only	**<10%** Commercial comingled recycling stream. Not recovering from MSW, no organics recovery. Estimated 70% recovery rate (OCC, UBC, Steel Cans, Plastic, Glass)	**Low Risk** Recovered materials go to same end markets as any single stream material
Monterey County (ReGen Monterey)	CA	Operating	Traditional Campus approach for Single Stream recycling, commercial recycling, food and	Waste Campus	**Medium** - operational since 2018 but methods and goals have evolved to outcomes with	**Medium to Low -** Market risk for recyclables	**Diversion %** not reported for former MWPF design which was abandoned Est. for C&D (not including generated fines)- ~20%	**Low Risk** Recycling recovery, C&D (wood, aggregate, metals plastic)

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FACILITY NAME	STATE	STATUS	TECHNOLOGY	TYPE	OPERATIONAL EXPERIENCE/ PAST PERFORMANCE	ECONOMIC/ OPERATIONAL RISK	DIVERSION	END USE
			yard waste 80 TPH processing (40 TPH for commercial mixed material)		lower ambitions		>95% of available recyclables	
RDS AMP ONE Portsmouth	VA	Operating	Innovative AI-assisted automated sorting, optical sorters, air devices, recirculation of identified recoverables, including fiber	MWPF	**Low -** Operating for one year on a relatively small scale, but overall approach informed by several years of operation at similar commercial-scale pilot plant in Atlanta	**Too Soon to Tell but promising** - No service disruptions or other issues with operations, operates a similar facility in Virginia	**80%** capture of recyclables. Potential production of biochar can be used for ADC % rigid plastic, 7% film (grade B or olefin for pyrolysis), 40% that is organics, 15% to 25% that is OCC and fiber. Can achieve higher diversion with things like conditioning a refuse derived fuel	**Medium Risk**- recyclables, biochar production and organics from MSW harder to find markets. So far, operation claims good acceptance
RePower South, Berkeley	SC	Operating	MWPF, engineered fuel, single stream capable, similar technology to O MRF	MWPF MRF	**Medium -** has operated for five years	**Medium** – Relies on single stream component, does sell some engineered fuel from MSW. Low landfill tip fee	**<25%** estimated diversion from MSW. **85%** estimated diversion from single stream	**Medium** - Fuel market spotty for MSW-derived output and fuel is a lower quality end-use

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FACILITY NAME	STATE	STATUS	TECHNOLOGY	TYPE	OPERATIONAL EXPERIENCE/ PAST PERFORMANCE	ECONOMIC/ OPERATIONAL RISK	DIVERSION	END USE
Georgia-Pacific Juno recycling facility	OR	Operating	Shred Autoclave, fiber recovery, wet, in-vessel, AD, back end MRF, and fuel recovery	MSW-RNG	**Low** - proven at small commercial scale for >three yrs without all components proposed in a larger system	**Medium -** demonstration system operating below designed capacity after 18 month "proof of concept" period	**64%** estimated Recovered / 31% Diverted	**Medium for Fuel and Fiber -** With the scaled-up system they will add more diversion features . Only option backed by large paper company
San Jose Green Waste Recovery	CA	Operating	90TPH Front end processing for recyclables Remove MSW, process/clean organics for shipment to ZWE dry AD, LF composting	MWPF with residue and organic output	**High -** required to meet 75 franchise collection for WC in San Jose	**Low -** funded through franchise collection	**30-60%** estimated diversion with up to 75% advertised, includes large Single Stream facility which sends residuals to GWR.	**Medium -** no reported issues in the literature. Likely fiber going to organics solution
Western Placer County/FCC	CA	Operating Re-Build in Construction	100 TPH retrofit- Front end processing for recyclables Remove MSW mixed organics and clean organics to	MWPF/ Mixed Compost, new SS facility, C&D Campus	**High** continuous operations since 1996. Building automated plant while still operating manual plant.	**Medium Risk**, (for new design) FCC operates similar facilities, mostly in Europe. Has not operated	**60%** recovery rate for MSW claimed. Some assumptions on paper and organics go into this that have not been proven out.	**Very High for Paper & Compost** Total recovery from MSW up from 22% to 60%; new materials-mixed paper to dryers to low grade bales; MWPF compost to landscaping or agro

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FACILITY NAME	STATE	STATUS	TECHNOLOGY	TYPE	OPERATIONAL EXPERIENCE/ PAST PERFORMANCE	ECONOMIC/ OPERATIONAL RISK	DIVERSION	END USE
			organics facility aerated in-vessel composting; process		Planning to open J 2025	such a system in the U.S.		(if permitted). Skeptical about very low-grade paper in export market & organic end use
WM "O" MRF	CA	Operating	Front end Mixed Waste, dry in-vessel composting, clean compost facility	MWPF/ Mixed Compost, new single stream facility, C&D Campus	**High** continuous operations since 2019, organics composting facility opened in 2021	**Medium –** Supported by strong regulatory environment where process fee cost is buried in franchise collection fees if system is not properly managed and maintained at a high level	**65%** Diverted - 100 ton/hour Organics Composting Facility: 60 TPH	**Medium –** Recyclables low quality; compost diluted to land application or landfill application
Enerkem Edmonton	AI, CAN	Closed	Shred, Syngas gasification, Fisher-Tropsch hot hydrolysis conversion to methanol	MSW-methanol	**Low -** Never hit projected numbers	**High -** System achieved projected operational and financial targets. Represented as a 25-year investment the facility	No data available	**Low -** 11-years of operation produced 5 million liters of fuel, far less than the projected 36 million liters per year

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FACILITY NAME	STATE	STATUS	TECHNOLOGY	TYPE	OPERATIONAL EXPERIENCE/ PAST PERFORMANCE	ECONOMIC/ OPERATIONAL RISK	DIVERSION	END USE
						was shut down after 11-years. Investment cost was never recaptured		
Entsorga West Virginia	WV	Closed	Mechanical biological treatment (MBT)	MBT	**Medium/High -** operational from 2019-2022. Never completed fuel conditioning system	**Unacceptable -** Safety, low tip fees, rodent control, fuel market concerns led to closure, failure to reopen and turbulence in foreign ownership	10-20% at beginning of operations	**High** - Cement kilns-not open year-round, unsuccessful in finding another location for end use material. Fuel use is a lower quality end-market
Fulcrum BioEnergy-Sierra BioFuels-Reno	NV	Closed	Syngas Gasification, Fisher-Tropsch hot hydrolysis to hydrocarbon crude. Fuel conditioning facility never constructed on back end	MSW-Fuel	**Low** - Only ran for two years before shutdown	**Unacceptable -** $500 million failure. Cost overruns, California restrictions on waste-to-fuel for diversion, low output. Many technical	Initial Capacity-Convert 175,000 tons of prepared landfill waste into 11 million gallons of renewable syncrude annually	**High -** Never finished work on conditioning plant for syncrude

FACILITY NAME	STATE	STATUS	TECHNOLOGY	TYPE	OPERATIONAL EXPERIENCE/ PAST PERFORMANCE	ECONOMIC/ OPERATIONAL RISK	DIVERSION	END USE
						issues. Only accepted Reno MSW and process residuals were directed to WM (project investor) landfill		
Fulcrum BioEnergy	IN	Cancelled	Gasification-planned 2nd Fulcrum plant	MSW-Fuel	**Very Low** - project in Nevada failed, this project has been cancelled	**Unacceptable** - Project in Nevada failed, this project has been cancelled	No data available	Up to 33 million gallons of jet fuel and processes up to 530,000 tons per year of prepared feedstock
Repower South Montgomery	AL	Closed	Conventional MWPF with RDF component	MWPF	**Low -** Two operators out of business in less than three years	**High -** conventional MWPF play not supported by regulatory structure or market tip fees. $37M project funded by public bonds in poor municipality	**<10%** estimated	**High -** poor quality paper and recyclable output. No data on fuel component promised by Repower

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FACILITY NAME	STATE	STATUS	TECHNOLOGY	TYPE	OPERATIONAL EXPERIENCE/ PAST PERFORMANCE	ECONOMIC/ OPERATIONAL RISK	DIVERSION	END USE
BHS- Lane County	OR	In Construction	Front end Mixed Waste Dry AD	MSW-RNG	NA/New Construction, scheduled to open July 2026	**Medium** - equipment systems in O-MRF and RePower South	**Medium** Targeting 160,000 TPY, 45-55% Diversion (including organics)	**Medium** - Will produce marketable recycling commodities and biogas for transportation, will be used in Lane County bus fleet
Athens Irwindale MRF	CA	In Construction	MWPF and AD	MSW/ Commercial MSW	NA/New Construction	**Low -** Cost recovery secured by long-term commercial franchise and residential contract processing payments	**Medium to High** Advertised at up to 85% of potential recyclables (RRS est. of $33 diversion of inbound)	**Medium -** plastics, metal and fiber and fiber, as well as biogas for energy generation

It should be noted that there are some other facilities not utilized for this white paper because the technology was redundant, low diversion, expensive, or has been closed recently, for instance, the MWPFs in southeast Massachusetts and Central Virginia, which have either closed or no longer processing mixed waste. The sampling is representative, however, of commercial scale options in the market.

3.10.1.1 Recommended Operating and In-Construction Advanced Mixed Waste Facility Approaches (see Task 4 Scenarios), Summary Costs, and Technical Requirements

Over the past decade, one of the most significant revelations has been the inability to scale waste-to-alcohol-based hydrocarbon solutions—such as syncrude, char, methanol/ethanol, and jet fuel—within the low tipping fee and low regulatory environment of the North American market. Despite more than a billion dollars invested in new facilities, many projects have either failed to reach completion or operated at recovery rates and output volumes far below expectations that caused their failure. While there are examples of these technologies operating in regions like Japan and the European Union, their success is largely dependent on processing highly stratified waste streams, stringent regulations, and the support of high landfill tipping fees that make such processes economically viable. Without similar incentives or supportive policies, these technologies remain commercially unfeasible in North America.

Technologies like gasification, pyrolysis, and hot hydrolysis refining of organics into sugars have proven to be extremely high-risk investments and are not currently recommended for Authority adoption.

The following is a list of recommended approach - proof points for advanced waste processing facilities in operation or under construction today for the technologies presented in Task 4 scenarios. Though many of the technologies are centuries old, they have recently been improving at a rapid rate because of advances in AI-assisted sorting methods and advanced conditioning and air systems for digestion, odor control, scrubbing and beneficial gas capture and are a part of the below facilities based on the research conducted and the criteria and metrics outlined in Table 7. These facilities, or the equipment they utilize, have demonstrated acceptable production histories with manageable risks and other favorable attributes. They have been vetted for estimated costs, outputs, and siting requirements where publicly available documentation permits. However, because to the private nature and consequent confidentiality posture of many of these operations, some criteria evaluation and economic estimates remain incomplete.

Especially important for both task 4 scenarios “D – High Diversion Wet/Dry MSW collection, Single Stream, and Co-Collection of Food + Yard Waste” and “E - High Diversion - Mixed Waste Technologies and Fiber Capture”, the proof points in the market now better identify the appropriate sorting technology to better extract recyclables on the front and to process organics on the back end within the following scenarios.

1. For Scenario D, instead of requiring the separation of organics through front-end screening and conditioning processes such as bag breaking, shredding, sizing, compressing, moving slurry to a wet anaerobic digestion facility, and caking the organic solids fraction, organics processing could be designed to operate independently of the front-end system within the Wet Dry scenario option.

2. For Scenario E, with the same front-end sorting and conditioning and back end organic core technologies would still be applicable across either high diversion scenario, with one notable exception: the Juno technology. In this approach, fibers are extracted prior to organics conditioning and anaerobic digestion, enabling paper recovery within the slurry created during processing. This technology is optimized for mixed municipal solid waste (MSW) collection scenarios, making it less effective in source-separated wet/dry systems.

The following recommendations are based on a summary of relevant data for preferred processing facilities for further research regarding acceptable technologies, required facility footprints, estimated capital expenditures (Capex), operational expenses (Opex), and, where available, anticipated revenue streams. While these details offer directional guidance, they should not be used for capital budgeting purposes. Further work is required to fully assess local conditions, costs, and additional site-specific factors, typically undertaken during the conceptual and preliminary engineering phases. Cost estimates presented in this document are highly preliminary (+/- 25%).

Finally, identifying the best processing system direction for the Authority requires consideration of the two stages of an MSW recovery system, 1) Upstream physical sorting for available recyclables and 2) downstream organic recovery.

1. **Physical Sortation Stage** – MSW sorting using innovative approaches such as AI-assisted scanning and image, gas signature, and/or x-ray recognition and data storage and coordinated optical air jet or robotic sorting provides capture rates that represent an improved state-of-the-art for the removal of high value commodities. The additions of practical recirculation and redundancy in automated capture systems for the most valuable available commodities, have further enriched the stream as it uses the automated sorting devices. As a result, the vendor-supported sorting solutions provided below (e.g., AMP One, BHS, Machinex, Stadler, VDRS) each can be predictably deployed to enhance diversion, yielding a flow of both valuable commodities and the conditioning of the organic fraction for use in the Organics Recovery Stage.

   Recovered commodity risks include incoming waste characterization, individual commodity recovery rates, and commodity marketplace value. The appropriate choice of equipment systems can dramatically impact the recovery rates and ultimate marketplace value, while incoming waste characterizations tend to be less tractable. That said, new approaches developed at both longstanding integrated equipment system providers (e.g., BHS, Machinex, Stadler, VDRS) are now better positioned to guarantee and fulfill much higher recovery rates and flexibility in the face of incoming material changes. New entrants to the integrated system provider marketplace like AMP are also demonstrating dramatically higher recovery rates and new approaches to system development overall. Together, the available system approaches will provide the Authority with a variety of viable suppliers.

   There have been many attempts to recover the paper fraction in mixed waste processing and 99% of them have been unsuccessful past the scalping of large pieces of unbleached OCC. Recently, a failed MWPF in Maine planned to have an intermediary step of pulling out wet fiber for capture. In the meantime, the Juno technology plant developed by GP Inc., a major producer of pulp and paper, has operated commercially for over three years in Oregon and further investigation of its fiber recovery is recommended before Organics recovery.

2. **Organics Recovery Stage** – There are numerous organics recovery technologies considered in the preceding sections. However, many of these approaches, especially those focused on high temperature conversion, although viable in a laboratory or in small-scale commercial settings, have proven to be infeasible both technically and economically.

   Digestion technologies remain the best approach for organics recovery. Composting, or aerobic digestion is feasible and less expensive than higher tech alternative. However,

the recovery profile for composted MSW is poor, because the resulting product is significantly contaminated. Similarly, anaerobic digestion is also proven and has been shown to be a viable operating approach in some markets. The ability to produce renewable natural gas (RNG) as a product that can be used in a variety of end uses has established a better economic profile than simple composting. Post-gas generation steps in digestate management options can take two pathways. First, liquids can be directed to local wastewater treatment facilities, where additional organic removal and effluent treatment occurs through secondary digestion. Second, solid digestate can either be composted (resulting material remains a problem in the marketplace) or directed after dewatering to a WTE facility as fuel. Recent high-profile concerns about PFAS substances contaminating MSW streams and persisting in solid digestate have arisen and are legitimate. The existence of PFAS in the flow further limits viable digestate management pathways.

Though not recommended now, the emergent feature could be the use of solid digestate in the production of biochar. Production of biochar, if proven out, would have the dual benefit of both binding or eliminating PFAS substances and sequestering carbon in both the production and use of the biochar. Although no current commercial scale applications of the biochar production systems are operating, several similar systems have been proposed for large public applications and are currently being seriously considered. This technology and approach to digestate management has been shown to be a justifiably exciting option and will require careful evaluation soon as an approach that could benefit the County significantly.

The next steps should include further investigation through procurement processes to gather more detailed information on each facility's technologies and their applicability to the Authority's specific needs, with the goal of achieving the higher diversion rates.

Table 17 presents the functional and operational key metrics suggested to be applied to each advanced mixed waste facility recommended for further study, which are presented in Table 18.

Table 18. Advanced Mixed Waste Functional and Operational Key Metrics

CRITERIA	DEFINITION	EVALUATION APPROACH	METRIC USED
Climate Benefit	Estimated or reported GHG emissions reduction or other benefit	Modelled emissions reduction from diversion and expected end use using U.S. EPA WARM (version 16). Assumptions on end use will be required, and score will depend on professional judgement	Tons CO_2 equivalent or estimated projection
Est. Capital Cost	Estimated cost to develop the site	Review data on up-front cost (infrastructure + land) through literature and/or outreach to operators and related jurisdictions.	Total Cost/Cost per ton
Est. Operating Cost	Estimated cost to operate the site	Review data on ongoing costs through literature and/or outreach to operators and related jurisdictions.	Cost (Opex plus annualized Capex) If known
Net Economic Benefits	Net economic benefits including Disposal Cost Savings, Tip Fees Generated, Commodity Value,	Qualitatively review data and reported costs-revenues, such as existing tip fees, expected tip fees, expected commodity revenue, which can be reasonably obtain	Qualitative known or estimated economic revenues, tip fees, savings from disposal costs, etc.
Footprint/Siting and Legal Political Risk	Ability to site in Broward County given function of facilities	Available development data and status. Qualitative description and estimated needs	Summary
Proof Point Best Practice	Why it is listed as a recommended facility to study further	Operations records, team visits to each, or understanding of facilities through projects or research	Qualitative identification of features for either front end MWPF sorting, organics processing or both

Table 19. Functional and Operational Key Metrics Applied to Each Advanced Mixed Waste Facility Recommended for Further Study

RECOMMENDED FACILITY NAME	CLIMATE	CAPITAL COST (+.- 20%)	OPERATING COST ROUGH EST. OR REPORTED $/T	AUTOMATION POTENTIAL STAFFING (ROUGH ESTIMATE)	NET ECONOMIC BENEFITS	EST. FOOTPRINT, SITING/ LEGAL/POLITICAL RISK	PROOF POINT BEST PRACTICE
Anaergia/ WM Sun Valley Recycling Park and Rialto AD	Up to 220,000 MT $C0_2$	$185 Million	Sun Valley Recyclables Capture/ organics conditioning/ Orex $150-200 Rialto Anaerobic Digestion, transport and process $100 Total Operating cost not available	25-35 No data available	Diversion of up to +40%- 160,000 tons per year net from the landfill (T&D in Los Angeles ~$85/T No other data available	Sun Valley 10-20 Ac. Zoning, solid waste permit, NIMBY Rialto- 30 Acres Waste Water Permitting, Odor, quality WWT output,	Conditioning of mixed waste organics, wet anaerobic digestion and water treatment plants which high diversion
Athens Irwindale MRF	Up to 190,000 MT $C0_2$	Est. $170M (not including WWTP effluent conditioning)	Est. Inbound MSW $65 (Not including disposal). Wet AD (on-site)	75-90 first shift, 40-75 second shift	$7-12M (rough estimate) commoditie s and RNG Rev.	15 Acres Already Permitted. Good Politics.	Highly advanced, front-end sorting, conditioning of the organic fraction, anaerobic

CAM #26-0492
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RECOMMENDED FACILITY NAME	CLIMATE	CAPITAL COST (+.- 20%)	OPERATING COST ROUGH EST. OR REPORTED $/T	AUTOMATION POTENTIAL STAFFING (ROUGH ESTIMATE)	NET ECONOMIC BENEFITS	EST. FOOTPRINT, SITING/ LEGAL/POLITICAL RISK	PROOF POINT BEST PRACTICE
			$49/T (not including WWTP by others)		Total capture of annual cost of ~$55M Opex plus profit		digestion on the back end
RDS AMP-One Portsmouth	750,000 tpy facility will sequester est. 300,000 MT $C0_2$	$20M bldg., $10M in fixed equip. capital ($300K- 350K ton/hour for 25 ton/hour system)	Est. $/T Range: Inbound MSW: $35-60 per ton, not including disposal costs (residual T&D)	750,000 TPY facility would generate 150 jobs directly indirectly, and induced	No data available	20 acres for 750,000 TPY MSW Facility	Use of recirculation and redundancy, with low-cost optical sorters and other air devices for high capture
Georgia-Pacific Juno recycling facility	High: If running at full capacity (330,000 tons) CO_2e will be reduced by 525,000 tons (1.59 tons CO_2e for every ton of	Very High Cost: $350-$500M $1000-$1500/ton of nameplate capacity Includes: Property, plant, equipment, infrastructure, startup costs,	Assumed medium-high cost. No specific detailed data available but expected higher Opex than simpler systems.	Highly Automated. All systems can be managed from the central control room. No sorters needed beyond pre-sort.	No data available	25 acres	Capture of fiber, anaerobic digestion, and recycling of water before water treatment for organics processing

RECOMMENDED FACILITY NAME	CLIMATE	CAPITAL COST (+.- 20%)	OPERATING COST ROUGH EST. OR REPORTED $/T	AUTOMATION POTENTIAL STAFFING (ROUGH ESTIMATE)	NET ECONOMIC BENEFITS	EST. FOOTPRINT, SITING/ LEGAL/POLITICAL RISK	PROOF POINT BEST PRACTICE
	material processed) compared to landfill	contingency, etc.					
FCC West Placer County **(In construction)**	No data available. Assume to be close to similar recovery to Athens Irwindale (220,000 MT $C0_2$)	High Cost - $141M retrofit, facility stated $100-120M (building already present, all for equipment)	Medium cost: $60-80/ton tip fee	Very automated with Van Dyk system. 14 opticals, 5 robots, screens, & shredders. 20-25 staff per shift, additional significant cost from maintenance, parts and electricity	No data available	320-acre waste management complex. Permits are required for air, water, building, and solid waste. Time consuming. Typical siting challenges	Planned, highly advanced, front-end sorting, conditioning of the organic fraction, aerobic contained composting for organics
WM O MRF	No data available- Mitigation of methane from Landfill	$120 million	No data available	+25 staff per shift	No data available	53-acre campus, including five recycling facilities, mulch colorization plant, clean compost facility, MWPF and planned new MRF	Highly advanced, front-end sorting, conditioning of the organic fraction, manual sorting for capture of mixed fiber on the residue line, aerobic in-vessel

RECOMMENDED FACILITY NAME	CLIMATE	CAPITAL COST (+.- 20%)	OPERATING COST ROUGH EST. OR REPORTED $/T	AUTOMATION POTENTIAL STAFFING (ROUGH ESTIMATE)	NET ECONOMIC BENEFITS	EST. FOOTPRINT, SITING/ LEGAL/POLITICAL RISK	PROOF POINT BEST PRACTICE
							composting for organics
BHS- Lane County	Mitigation of methane from Short Mountain Landfill - the largest source of greenhouse gas (GHG) emissions from County operations. Equivalent reduction of taking 20,000 cars off the road for the next 25 years. Facility claims huge reduction	$150 Million $45 Million would cover Lane County's portion of the project costs. The remaining $105 million will be covered by BHS	Charge county $69/ton, internal cost of disposal $31/ton, but varies based on tonnages	Highly automated - 52 total staff	Revenue sharing exists above a set threshold	Processing and service agreement, permitting and construction in process	Highly advanced, front-end sorting, conditioning of the organic fraction, anaerobic digestion on the back end

4.0 SOLAR PHOTOVOLTAICS ON LANDFILLS

The installation of solar photovoltaic (PV) systems on closed landfills provides an opportunity to repurpose otherwise underutilized land for renewable energy generation. The following sections identify advancements, strategies, and challenges in landfill-based solar PV projects. The discussion includes an overview, system types, and critical considerations such as location, access, foundations and wind, stormwater, security, interconnection, and economics, while emphasizing sustainability and the importance of recycling PV materials.

4.1 OVERVIEW

Closed landfills represent a significant opportunity for renewable energy generation due to their large, open areas and proximity to grid infrastructure. Solar PV installations on these sites align with sustainability goals by repurposing non-productive land while minimizing environmental impacts. Landfill sites, often encumbered by restrictions on traditional redevelopment, provide unique advantages for solar PV projects, such as reduced land acquisition costs and community support for environmentally friendly initiatives.

4.2 SYSTEM TYPES

4.2.1 Fixed Systems

Fixed-tilt solar PV systems are widely used in landfill applications due to their simplicity and reliability. These systems involve panels mounted at a fixed angle to optimize sunlight capture. Fixed systems are typically ballasted to preserve landfill cap integrity and require careful design to address differential settlement and site-specific wind conditions. The durability and lower maintenance requirements of fixed systems make them a popular choice for long-term energy generation projects.

4.2.2 Tracking Systems

A tracking solar system (i.e., single or dual axis) uses mechanisms to continuously adjust the PV panel angle throughout the day to follow the sun's movement, resulting in significantly more energy production from the tracking system, but at a higher initial cost, and with increased maintenance needs compared to the fixed tilt option. It is a great option for limited space where the increased efficiency can provide additional generation. Generally, this is not ideally suited for a landfill application due to the additional racking and foundation requirements.

4.2.3 Closure System Integration

Erosion issues on landfill slopes, exacerbated by weather conditions like rain and wind, necessitate regular upkeep. Conventional closure methods, which use a thick soil layer and vegetative cover, not only take considerable time to install but also demand high maintenance costs. Geomembrane closure turfs consist of a textured geomembrane, an artificial grass turf designed for landfills along with a specified backfill material. This type of closure system allows for the direct attachment of solar panels while virtually eliminating the racking structure required.

4.3 CONSIDERATIONS

4.3.1 Location

The location of a landfill solar PV project significantly influences its feasibility and performance. Factors such as solar irradiance, proximity to grid infrastructure, and the landfill's size and shape, must be evaluated during the planning phase. It is important to select sites with minimal shading and optimal orientation for maximum energy production. Local climate conditions, including temperature variations and seasonal weather patterns, must also be considered to ensure consistent energy output.

4.3.2 Access

Access to the landfill site is a critical consideration for construction, operations, and maintenance. Roadways and pathways must support the transport of equipment and materials without compromising the landfill cap. Proper access planning ensures safety and efficiency throughout the project lifecycle. Additionally, ensuring year-round accessibility for maintenance and emergency response crews is essential, particularly in regions with harsh winters or frequent storms.

4.3.3 Foundations and Wind

Landfill solar PV projects must be designed to withstand site-specific wind conditions. High winds can pose risks to panel stability and mounting systems. Wind load assessments can inform the selection of racking systems and the placement of panels. Enhanced mounting systems with increased ballast weights or aerodynamic designs may be required in areas prone to extreme wind events.

4.3.4 Security

Ensuring the security of the solar PV installation is vital to prevent theft, vandalism, and unauthorized access. Fencing, surveillance cameras, and lighting are common security measures recommended for any solar installation. Secure access points and regular monitoring enhance the overall safety of the site. Advanced technologies such as motion detectors and remote security monitoring systems can provide an additional layer of protection, especially for large or remote installations.

4.3.5 Interconnection

Understanding the local energy demand and potential uses for generated power is crucial. Landfill solar PV projects may supply power to municipal facilities, support on-site operations, or feed into the grid. It is critical to evaluate the utility interconnection requirements and grid compatibility during project planning by submitting a preliminary interconnection application to the utility. Emerging technologies such as battery storage systems can enhance the value of landfill solar PV projects by providing backup power during peak demand periods or grid outages.

4.3.6 Economics and Funding

Economic feasibility is a key driver for landfill solar PV projects. Factors such as installation costs, available incentives, energy production potential, and maintenance expenses must be considered. A detailed financial analysis leveraging federal and state incentives to enhance the project viability should be performed. Programs like the Investment Tax Credit (ITC) and renewable energy certificates (RECs) can significantly improve project economics. Additionally, landfill solar projects often qualify for grants or funding aimed at promoting renewable energy development. More recently,

community solar PV projects are being promoted and developed by many cities and municipalities to support municipalities broader renewable energy goals. These Environmental Justice (EJ) solar PV projects are being driven to provide access to clean energy and create opportunities for low-income communities.

4.3.7 Decommissioning

When referring to a PV system, decommissioning usually includes removing the PV array, removing the balance-of-system (e.g., other parts of the system, excluding modules, such as wiring, inverters, mounting system), and restoring the land. Decommissioning policies and requirements can vary greatly from state to state, granting certain jurisdictional powers to either state or local governments.

4.4 SUSTAINABILITY AND RECYCLING

4.4.1 Recycling of Solar PV Materials

As solar PV panels approach the end of their lifespan; recycling becomes a critical component of sustainable project planning. It is important to recycle PV materials to recover valuable components such as silicon, glass, and various metals and alloys. Recycling processes not only reduce landfill waste but also support the circular economy by reintroducing materials into the manufacturing cycle. Companies specializing in solar panel recycling are emerging, offering innovative solutions to address the growing volume of retired panels.

4.4.2 Circular Economy Approaches

Incorporating circular economy principles from project inception enhances sustainability. This includes sourcing panels made from recycled materials and establishing partnerships with recycling facilities to manage end-of-life panels effectively. Designing for disassembly and modular construction can further streamline recycling processes, reducing costs and environmental impacts.

4.4.3 Policy and Industry Trends

Growing awareness of solar PV recycling has spurred policy developments and industry collaboration. Some states have implemented mandatory recycling and extended producer responsibility programs for solar panels, while others are developing standards to ensure that materials are responsibly managed. These efforts align with broader renewable energy goals and the push for greater sustainability in the energy sector.

4.5 FUTURE OPPORTUNITIES

Solar PV installations on closed landfills represent a win-win solution for renewable energy development and land reuse. As beneficial land reuse and sustainability continue to evolve, these projects become increasingly viable and impactful. Addressing key considerations such as location, access, foundations, stormwater, security, utility interconnection, and economics ensures project success. The integration of sustainable practices, advanced technologies like battery storage, and stakeholder collaboration will be key to maximizing the potential of landfill-based solar PV systems.

5.0 PER- AND POLYFLUOROALKYL SUBSTANCES CHALLENGES AND OPPORTUNITIES

The emerging and urgent body of literature on PFAS (per- and polyfluoroalkyl substances) and its impact on MSW treatment facilities is an important consideration. While a full analysis of this evolving concern is beyond the scope of this White Paper, this section provides a brief overview of the current situation with an emphasis on the implications and challenges related to the future technologies discussed.

PFAS are prevalent in many consumer products, textiles and food packaging, and can accumulate in soil, water, and organisms. PFAS contamination of organic streams can come from food packaging or the food itself and PFAS may leach into liquid effluent generated during MSW processing.

Composting and anaerobic digestion processes do not inherently remove or destroy PFAS compounds. Thus, if materials entering the facility contain PFAS, they can persist or accumulate during processing.

The focus of PFAS regulation has primarily been on drinking water standards. The recent National Primary Drinking Water Regulation (NPDWR) establishes limits for PFAS in drinking water and requires the Publicly Owned Treatment Works (POTW) to monitor PFAS levels and to conform to the limits within five years (U.S. EPA, 2024a). Thus, liquid effluent discharged to the POTW including liquid digestate from the Anerobic Digestion (AD) process will be subject to PFAS mitigation as part of treatment. It is uncertain whether any testing or limits will be imposed for those discharging to the POTW.

The latest guidance on the destruction and disposal of PFAS is provided in the U.S. EPA's Interim Guidance Update and includes several established technologies along with some novel technologies which show promise for capture and/or destruction (U.S. EPA,2024b). Included in these technologies are the thermal conversion technologies of pyrolysis and gasification. While it remains a subject for further investigation and research, pyrolysis followed directly by combustion of the syngas produced in a thermal oxidizer (after burning) may be an effective form of PFAS destruction (U.S. EPA,2021). This technology is best suited for feedstock with low moisture but concern over PFAS applied to crops or agricultural land as fertilizers have also been raised so PFAS contaminated of the dewatered AD solids may also need to be addressed. However, using pyrolysis to treat the separated digestate solids is encouraging. A benefit of pyrolysis over other potential thermal conversion technologies (e.g., high temperature combustion) is that it results in a valuable co-product, biochar. In addition to its value in sequestering carbon, improving soil health, and accelerating microbial processes (e.g., AD, composting) biochar can play a valuable role in PFAS management. At the most basic level, the end product results in material volume reductions of more than 90% compared to the input solids, making transport and use or disposal more energy efficient and lessening the environmental impacts (e.g., lower landfill leachate PFAS loadings compared to biosolids disposal) (U.S. EPA, 2021). Further, the unique physical properties of biochar, which are similar to those of activated carbon, lend its application to the extraction of pollutants. Studies have shown encouraging results in using biochar as a filter to capture PFAS as well as microplastics and pharmaceuticals and chemicals from personal care products (Keller et al., 2024). Biochar produced in an organics processing facility could be a valuable consideration and option to reduce or eliminate PFAS contamination present in liquid digestate from AD processing or effluent from MSW processing. In addition, contaminated organics entering the composting process is also a concern as the moderate temperatures and microbial activity in compost systems are insufficient to break the strong molecular bonds of PFAS. Adding biochar or materials with similar binding properties to the

composting process may reduce the mobility of the PFAS. However, this does not destroy PFAS, and disposal of the PFAS-laden material must be managed carefully. Emerging chemical treatments like advanced oxidation processes or bioremediation are being explored but these are not yet practical for large-scale application in compost systems.

The most effective strategy is to prevent PFAS-containing materials from entering the composting stream. Currently, Florida does not have specific state-level regulations addressing PFAS in food packaging. However, the state is actively involved in broader PFAS management and contamination mitigation efforts (FL DEP,2021). Regular testing of feedstock materials for PFAS, optimizing waste separation (such as screening out coated food packaging) and monitoring PFAS levels in the final compost product can help ensure compliance with safety standards.

The bottom line is that agencies responsible for managing MSW should stay informed on the evolving regulations and technological advancements in PFAS mitigation.

Attachment A

Brief History of U.S. Waste Management Technology and Practices Last Sixty (60)-Years

1960s–1970s: Early Days of Waste Management and Advanced Recovery
1) Waste management centered on landfilling and incineration, with little focus on material recovery. Growing environmental concerns (e.g., non-point source odor, toxic air and water emissions) and shrinking landfill capacity gradually boosted interest in waste recovery.
2) Recycling Initiatives: Re-introduction of WW-II era separation of mixed recyclables focused on source-separated recycling of materials like paper, glass, and metals. Some emphasis on processing mixed waste manually but not widespread, failures abound. Inefficient 5-7 Bin collection vehicles with manual curb sorting from small household storage bins.
3) Controlled Incineration as a Primary Treatment Method: Incineration with minimal pollution control was widely used to reduce waste volume and mass, but the practice led to public outcry due to concerns about air emissions. In addition, the 15 – 45% of ash remaining after combustion required special handling and its own disposal.

1980s: The Emergence of Mixed Waste Processing
1) Rise of technologies that suggested their ability to more effectively recover useful materials from mixed MSW. Many of these innovations were spurred by increasing environmental regulations and a push for higher resource recovery.
2) Dual Stream Materials Recovery Facilities (MRFs) were created to separate recyclables collected curbside, with 2D paper in one stream and 3D containers in another. Trucks were divided into two bins, and densification improved payloads. New materials, like PET bottles, were added, and sorting used mechanical methods like screens, eddy currents, air knives, and magnetic separators, along with manual sorting. Early MRFs were basic, relying heavily on homeowners and businesses to pre-sort materials.
3) Refuse-Derived Fuel (RDF): RDF technology emerged to produce a combustible fuel from the organic fraction of mixed MSW. Mechanical processes shredded the waste and separated inert metals, glass, and non-combustible materials. The resulting RDF could then use in industrial boilers or power plants. In some states, RDF could be “counted” as diversion.
4) Early Composting Technologies: In the 1980s, pilot projects for composting separated green waste and mixed waste began. While composting reduced waste volume, mixed waste compost was often too contaminated and of poor quality to sell. Municipal yard and green waste composting emerged across the U.S., with many areas adding a third green waste collection, even without composting facilities.
5) Waste-to-Energy (WTE) Facilities: WTE facilities using mass burn incineration technology gained acceptance, especially in countries with limited landfilling capacity. RDF manufacture receded because it could not compete with mass burn efficiency. Modern WTE plants first incorporated advanced air pollution control technologies (SO2, particulates, especially heavy metal capture.

1990s: Technological Advancements and Diversification of Waste Treatment

The 1990s marked significant progress in waste processing, with new technologies developed to better manage and recover resources from MSW.

Advances in Mechanical Sorting: In 1998, Single Stream recycling was introduced on the east coast to reduce collection costs through optimum densification of materials. Larger rolling carts (5x) replaced bins, increasing convenience and participation. New technologies, like motor control systems that adjusted to material conditions, closed air density separation, optical sorters, and automated storage, boosted MRF efficiency. Larger facilities used gravity and conveyor-fed baling for automatic densification of materials.

Increased Adoption of Advanced RDF: More sophisticated systems, incorporating better shredding, separation, and drying technologies to produce higher-quality fuel for better markets. Some facilities began co-firing RDF with coal as recognition of the operational difficulties and emissions faced by RDF only facilities. Closure rate of these facilities high despite increased development efforts.

Composting Gains Traction: Source-separated organics composting became more common; many states implemented yard debris landfill bans, leading to the quick expansion of outdoor, windrow composting facilities around the country. Mixed-waste composting continued to struggle with contamination, odor, and other emission issues. Some large facilities spectacularly failed (e.g., Reuter, Baltimore).

Emergence of Mechanical Biological Treatment (MBT): MBT facilities combined mechanical front-end sorting with biological treatment (composting or anaerobic digestion) to handle mixed waste. The goal was to stabilize organic matter and recover recyclables, i.e., Nova Scotia.

2000s: Integration of Thermal Treatment and Increased Focus on Waste-to-Energy

1) The 2000s saw a significant shift toward advanced waste-to-energy, though a quiet and spreading moratorium occurred for large mass burn facilities. Though capacity remained steady during this decade and in Florida, no new facilities were being built anywhere in North America.

2) Advances in Mechanical Sorting: Automated sorting boosted productivity and safety in MRFs, enabling the growth of single-stream collection with larger carts and automated trucks to reduce energy use and costs. Larger single-stream facilities, like the record-setting Elkridge, MD plant, processed more than 25,000 tons per month. Optical sorters replaced more manual stations, allowing continuous operation. Enhanced air classification, centralized HVACs, and new sorting tech improved capture of small materials. Meanwhile, steady demand for mixed paper grew, and advanced shredders and screens better sorted plastics, while optical sorters handled more plastic bottles and food containers in mixed waste facilities.

3) Growth of Mechanical Biological Treatment (MBT): Originating in the late 1970s, MBT combines waste sorting and organic treatment, working best in regions with high landfill fees. In North America, a 1990s-era plant in Nova Scotia still operates.

4) MBT is the combination of two approaches to sorting waste after de-bagging and shredding material to liberate it from plastic bags.

   A. The first step is sorting uncontaminated recyclables, like bottles, cans, boxes, OCC, and scrap metal, using similar technology to mixed waste facilities.

   B. The second step treats the remaining highly organic stream (food, paper, non-rigid plastics) through composting or drying, creating RDF fuel for energy use. Inert materials like glass and rocks are screened out, and the material is often densified into high-BTU pellets for stable, efficient combustion and long-term storage. Pellets allow longer term storage than shredded RDF and have a more consistent burn for boilers.

   MBT facilities became widely adopted in Europe, where they were used to comply with landfill diversion targets, enjoyed more fuel end markets, and competed against much higher landfill tip fees (over $150 T average at the time).

5) Emergence of Advanced Mechanical Biological Thermal Treatment (MBTT): During the same time, MBTT incorporated a thermal treatment step to further reduce the volume of waste and produce energy. MBTT aims to recover energy while minimizing the production of emissions. Again, lower landfill tip fees in the U.S., limit the spread of this technology, which has a much higher cost basis. Common MBTT approaches include:

   A. Gasification involves heating organic material at high temperatures (700–1,500°C) with a limited amount of oxygen. This partial combustion produces syngas (a mixture of hydrogen, carbon monoxide, and other gases), which can be used for energy, fuel, or chemical production. Syngas can power turbines, generate electricity, produce hydrogen, or serve as feedstock for synthetic fuels and chemicals.

   b. B. Pyrolysis heats organic material at lower temperatures (400–800°C) in an oxygen-free environment. The absence of oxygen prevents combustion and instead breaks down the material into gases, bio-oil, and solid char. The bio-oil can be refined into fuels, while char is used in agriculture or as a fuel. Pyrolysis is more commonly applied to create biochar and renewable fuel.

Increased Adoption of RDF in Cement Kilns: RDF became a more popular alternative fuel for the cement industry, where it was co-fed with traditional fuels. This market trend grew as applications for RDF stumbled elsewhere.

2010s: Integration of Circular Economy Principles and Advanced Technologies

1. The 2010s marked a shift toward a more circular economy approach, focusing on maximizing material recovery and minimizing residual waste.

2. Waste Characterization Changes: Waste stream evolution led to a concept called “The Evolving Ton” in which dramatic reduction in newsprint, glass, and office paper along with the increase of plastic packaging leads to a less dense and more difficult to separate stream of household and commercial recyclables.

3. Advanced MRFs and Sensor-Based Sorting: In response to the evolving ton and industry desire to recover a more diverse stream of materials, MRFs evolved to include sensor-based sorting technologies like near-infrared (NIR) spectroscopy, robotic sorting, and artificial intelligence (AI) to handle complex streams and improve material purity.
4. Improved Composting and Anaerobic Digestion: Source-separated organics processing matured, while mixed waste composting was largely abandoned in favor of MBT and anaerobic digestion. Anaerobic digestion gained traction as a way to produce biogas from organic waste.
5. Refinement of RDF and Solid Recovered Fuel (SRF): RDF production focused on improving fuel characteristics, and the term SRF (solid recovered fuel) was introduced to designate higher-quality RDF for specific industrial applications.
6. Thermal Treatment Technologies: Pyrolysis, gasification, and plasma arc technologies were explored for their potential to produce synthetic gas (syngas) and reduce waste to inert slag. However, these technologies faced economic and technical challenges in scaling up.

2020s and Beyond: Integration of Digitalization and Circular Economy Models
1. Recent developments reflect a growing emphasis on sustainability, efficiency, and digitalization in waste management.
2. Decline in National Recycling Rate: With recycling rates peaking in the mid-2010s, communities and policymakers are now focusing on boosting recovery through food waste recycling, C&D processing, and MSW sorting. This push aligns with corporate goals for recycled plastic in packaging, which is driving demand for more recycled product.
3. Digital Sorting Technologies: AI and machine learning are increasingly used to optimize sorting and improve recovery rates in MRFs.
4. Chemical/Advanced Recycling: Petrochemical and entrepreneurial efforts to establish cost effective recovery of plastics to fulfill packaging targets focus on pyrolysis approaches to build recycled resin feedstock (especially for food contact applications) streams.
5. Carbon Capture and Circular Economy Integration: Modern MBTT facilities are exploring the use of carbon capture technologies and integrating circular economy models to achieve near-zero waste and carbon neutrality.
6. Increased Emphasis on Organics Recycling: Anaerobic digestion is being coupled with advanced composting techniques to handle a wider range of organic waste, reducing the volume of landfilled materials and producing renewable energy.
7. Biochar production from contaminated organic MSW streams shows opportunity for carbon sequestration and PFAS mitigation.

Attachment B

Additional Resources

COLLECTION SYSTEM TOOLS

Smart Waste Management Apps

Call2Recycle – Collection Partner: https://www.call2recycle.org/collection-partner/

Call2Recycle – Drop-Off Locations: https://www.call2recycle.org/Locator/

Evergreen Disposal – Disposal App for Residents: https://www.evergreengarbage.com/app

The Recycling Partnership – Recycle Check: https://recyclingpartnership.org/recyclecheck/

Earth 911 – iRecycle: https://earth911.com/irecycle/

DRONE TECHNOLOGIES FOR MANAGEMENT OF COLLECTION AND DISPOSAL SYSTEMS

Autonomous Methane and H_2S Monitoring

Autonomous H2S detector. (n.d.). Elscolab. Retrieved December 11, 2024, from https://elscolab.com/en-be/products/autonomous-h2s-detector

Sniffer Robotics. (2023, January 5). U.S. EPA Approves the SnifferDRONE™ for Monitoring Landfill Methane Emissions. *PR Newswire*. https://www.prnewswire.com/news-releases/us-epa-approves-the-snifferdrone-for-monitoring-landfill-methane-emissions-301714629.html

Gålfalk, M., Nilsson Påledal, S., & Bastviken, D. (2021). Sensitive Drone Mapping of Methane Emissions without the Need for Supplementary Ground-Based Measurements. *ACS Earth and Space Chemistry*, *5*(10), 2668–2676. https://doi.org/10.1021/acsearthspacechem.1c00106

Landfill Monitoring

Active Flow Control & Real-Time Gas Analysis to Maximize Landfill Gas Collection . (n.d.). Retrieved December 11, 2024, from https://locicontrols.com/hubfs/PDFs/System%20Collateral/LoCI-Controller_060724.pdf?hsLang=en

Bingham, B., & Britton, P. (n.d.). *Automated Landfill Gas Collection Increases Landfill Gas Flow and Quality at Oklahoma City Landfill*. Retrieved December 11, 2024, from https://locicontrols.com/hubfs/PDFs/Technical%20Papers/Aria%20Energy%20Technical%20Paper.pdf?hsLang=en

NFPA 497 - Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas. (2024). https://www.nfpa.org/codes-and-standards/nfpa-497-standard-development/497

Control of Industrial Processes. (n.d.). SCS Engineers. Retrieved December 11, 2024, from https://www.scsengineers.com/services/remote-monitoring-control/control-of-industrial-processes/

SCS Remote Monitoring and Control®, SCS RMC®. (n.d.). SCS Engineers. Retrieved December 11, 2024, from https://www.scsengineers.com/services/remote-monitoring-control/

Technology: Landfill Gas Flare Remote Monitoring. (n.d.). SCS Engineers. Retrieved December 11, 2024, from https://www.scsengineers.com/scs-project-case-stu/technology-landfill-gas-flare-remote-monitoring/

STATE OF AUTONOMOUS COLLECTION TECHNOLOGIES

AI-assisted Autonomous Vehicle Garbage Collection

AI-assisted autonomous vehicle garbage collection is now a few years away and will soon be a preferred collection method over the planning horizon and an understanding of the current state of this technology is required now.

AI-assisted Autonomous Vehicles at Landfills, MRFs and Transfer Stations

SMS Equipment. (2020, August 6). *Komatsu customers surpass 3B metric tons moved autonomously*. SMS Equipment. https://www.smsequipment.com/en-ca/news-resources/press-releases/2020/komatsu-customers-surpass-3b-metric-tons-moved-autonomously/

Tserng, H. P., Ran, B., & Russell, J. S. (2000). Interactive path planning for multi-equipment landfill operations. *Automation in Construction*, *10*(1), 155–168. https://doi.org/10.1016/S0926-5805(00)00073-X

Advanced Mixed Waste Processing

Table 18

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Appendix N

Task 8 White Paper – Education and Outreach

Solid Waste Authority of Broward County

Task 8: Program Outreach and Education Best Practices White Paper

Solid Waste Authority of Broward County
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SCS ENGINEERS

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1.0 OVERVIEW

All recycling guidelines evolve over time. These changes are essential to keeping up with market fluctuations, advancements in recycling technology, updates to waste hauling agreements, and in situations like Broward County, when a countywide or regional solid waste authority is formed. However, people generally don't understand these dynamic shifts in the industry and often lack the up-to-date information needed to recycle correctly. Residents are also regularly moving into and around the County, requiring harmonization and routine distribution of the most basic information on recycling. Residents often believe they know how to recycle, but when tested, they're frequently mistaken, confused, or relying on outdated information. This leads to "wishcycling," or hoping that what they put in their recycling bin, will be recycled.

As packaging design and recycling innovations continue to evolve at a faster pace, we need a robust "communications infrastructure" that matches our collections systems. This will help bridge the gap, encourage people to adapt to ongoing changes, and make learning about recycling more accessible and rewarding.

Without consistent information, feedback on recycling habits, or a clear resource for answers, people often create their own recycling methods or rely on those of other recycling programs. Unfortunately, these are often based on misconceptions or outdated knowledge, leading to unintentional mistakes. This contributes to the contamination of collected recyclables, which can no longer be processed, and end up being disposed of as trash. Harmonization and consistency of messaging across programs within the County and across all impacted sectors (e.g., residential, commercial, institutional) is key to an effective education program.

It's important to note that just being aware of a concept does not guarantee that the correct behavior will be taken. For example, one might read somewhere that cans should always be recycled. However, if that individual reads that action one time, it's not repeated, and a "trusted" voice doesn't reinforce that action, then it is unlikely the individual will continuously perform that action. This notion of behavior change is essential when creating an education, engagement, and marketing plan around waste disposal and reduction. By following these best practices around basic education principles, confidence in the system will increase, new and correct behaviors will be learned, and incorrect behaviors can be diminished.

The three main stages around behavior change include the following:

1. **Access** - Access typically refers to whether recycling bins are available at a place of residence or whether residents have to walk or drive to drop off centers. This further reflects factors that influence a person's ability and opportunity to recycle -- convenience. Do people have convenient access to the services and recycling bins necessary for successful participation no matter if it is at home, at work, or around the community?

2. **Knowledge** - This involves the information people need to make decisions about what, when, and how to recycle. Are there clear guidelines on what belongs in the recycling bin, such as on-container labels, mailed guides, smart apps, or online resources? How frequently are they receiving updates and reminders? Do product and packaging labels support or hinder their understanding? Are there signs around the community and their workplace that clearly states what should go where and are the bins convenient?

3. **Engagement** - This is more abstract and involves an individual's values, beliefs, attitudes, and identity, as well as the social dynamics and norms within their household, workplace, and community. Essentially, it addresses the question: once someone has access to recycling and the necessary information, will they actively participate, and will they do so correctly? Does their employer, landlord, park/school/museum, show them where to dispose of their waste, make it convenient and easy to dispose of their waste, express the importance of putting the right material in the correct bin?

2.0 ACCESS

Ensuring that each resident, employee, visitor can conveniently recycle or reuse materials that are at their end-of-life as easy as it is to throw something away, access is vital to the success of any recycling or zero waste program. It is vital that all residents, including employees and visitors, regardless of their ethnicity, primary language, or socioeconomic status have the same access to these programs and that the instructions they receive to participate in the programs are in their language of choice.

Another important part of this stage is speaking with the disposal facilities and haulers to determine the most problematic materials and the neighborhoods with the least participation. We can use the information from these conversations to determine the greatest challenges, verify that the data we have is correct, and inform our education materials. It is our baseline data along with the recent studies on generation and collection to understand the current state of the system. These baseline measurements will be repeated and compared to be used as the measurement of success at regular intervals during the program.

3.0 KNOWLEDGE

Former Secretary-General of the United Nations, Kofi Annan, once said," Knowledge is power. Information is liberating. Education is the premise of progress, in every society, in every family."

In behavior change, the more we understand about our audience and what they know about this issue and who they trust, the more likely it is that we can change their behaviors. If we make assumptions about our audience, the less likely it is that we will change their behavior.

By surveying Broward County residents, businesses, and institutions, to determine what they know, who they trust, and the obstacles to their behavior, we can then tailor the education materials to meet their needs. Messaging must be informed by investigation and quantitative research to be effective. In addition, basing our messaging on these factors will help to build relationships and gain trust and confidence – this is vital to the success of any materials management program.

Conducting the surveys through multiple modes (e.g., electronic, phone, focus groups), and in multiple languages (e.g., English, Spanish, Haitian Creole), facilitates reaching the diverse population that makes up Broward County. For example, younger residents earning below the median income of the County will be more likely to respond to an electronic survey than a phone survey, whereas an older population will be more likely to respond to a phone survey. The diverse audience that will be reached by the electronic and phone surveys then allows us to be more selective in our recruiting for the next step in the knowledge phase, in-person focus groups. Participants in all different tactics of this phase need to be targeted to be representative of the diversity of Broward County's population to ensure equity and inclusion and to inform the materials that we will create to ensure they will be impactful to a wide range of audiences.

Commercial businesses and institutions can be reached through engagement and through electronic surveys. Once a list is compiled, sending a postcard to the list with a QR code to the survey that includes an incentive, such as being entered into a drawing for a $50 gift card, is usually sufficient to get baseline information from these audiences.

In-person focus groups offer a more dynamic conversation than online or phone surveys, however, for residents. Often people feed off the opinions and enthusiasm of others, which helps to ensure that the conversation continues. Some barriers to in-person participation include that it takes more time and effort by the participant (requiring a higher cash incentive for participants), and sometimes participants talk over each other, meaning some of the content is lost despite the efforts of a diligent moderator. However, the in-person approach offers a better ability to observe non-verbal cues (to better understand the mood of participants), to introduce hands-on exercises (which help with determining the effectiveness of messaging and/or messengers), and to gather more detailed feedback on specific messages.

A strong investment in education is necessary to ensure that people are well-informed and motivated to recycle. This strong investment can boost a recycling rate beyond levels that could be achieved with infrastructure improvements alone. Research in various U.S. communities[1] conducted by The Recycling Partnership, a national nonprofit that is the gold standard on recycling education, found that combining access to recycling with comprehensive education not only improves and maintains high recycling rates but also results in cleaner materials for MRFs and reprocessors.

[1] Resource Recycling: *The Cost of Transformation*. https://resource-recycling.com/recycling/2021/08/15/the-cost-of-transformation/

Resident confusion is one of the key reasons why they do not recycle correctly[2]. To reach residents and reduce confusion across municipal areas and sectors, it is best to harmonize the list of what can and can't be recycled. This, of course, can only be done if all the communities within the Solid Waste Authority have the same list of materials that can be disposed of through recycling, organics, and other disposal programs. That way, if someone works in Lauderhill, but lives in Coral Springs, and goes to the beach in Pompano Beach, they can be certain that they are recycling correctly no matter where they are within the County. Harmonization and consistency in messaging (look and say the same things across jurisdictions) are crucial to reducing resident recycling confusion and thereby reducing contamination. Making it easier to understand what, how, and where to dispose is likely to increase participation in County disposal programs. Education must be consistent and outwardly obvious wherever possible, e.g., always place recycling bins next to trash receptables, identify with images what goes in what bin, advertise at bus stops and on buses, place information in highly visible spots in libraries and community centers, and work with grocery stores on food waste education placement.

Making knowledge easy to access is also a key factor in reducing contamination and increasing participation. It is important that residents know what website, tool, or app to access to get their most up-to-date information. If a Smart App is not obtainable due to cost, a tool called a Waste Wizard can be integrated into the website for use by residents to determine how best to dispose of a specific product or material. However, residents need to know that these tools are available and must be reminded regularly to use them.

A best practice approach is to send a mailer to residents three times a year that they can hang on their refrigerator or other prominent place to see what is and isn't to be disposed of on what day (including a schedule). Sending a postcard that specifically mentions a top contaminant is another good practice. There are several Smart Apps for recycling that can help the County implement a harmonized program . Regularly updating both the database that backs up the app and the website is imperative to a successful program. Whichever source of truth is used by the County, it must be convenient for residents, businesses, and institutions to utilize to be truly effective.

Knowledge is a key factor in the reduction of all types of waste. During a recent study by Resource Recycling Systems (RRS) and the University of Maine's Mitchell Center,[3] interviews with Maine residents revealed that they were not aware of the amount of food waste that each house produces, what could be done to reduce that food waste, nor the impact of food waste on greenhouse gas emissions.

In 2018, RRS worked with the Solid Waste Authority of Central Ohio (SWACO) on a Food Waste Action Plan.[4] As a result of that plan, SWACO developed a "Save More than Food" or SMTF Campaign. This included developing a website, creating a supporting education and outreach campaign, and creating a community

[2] The Recycling Partnership: *Consumer Research on Recycling Behavior*. https://recyclingpartnership.org/consumer-research-on-recycling-behavior-and-attitudes-regarding-on-pack-labeling/

[3] University of Maine Food Waste Study: https://umaine.edu/mitchellcenter/umaine-led-first-of-its-kind-food-waste-study-shines-light-on-where-food-is-wasted-in-maine/

[4] SWACO Food Waste Action Plan: https://www.swaco.org/DocumentCenter/View/2086/Central-Ohio-Food-Waste-Action-Plan

drop-off composting program for those who otherwise would not be able to compost. The goal of the campaign was to connect local residents, schools, businesses, and other members of the community to food waste reduction education materials. In the spring and summer of 2021, SWACO evaluated the effectiveness of the campaign using grant funding provided by the U.S. EPA. This evaluation was conducted in partnership with The Ohio State University and the city of Upper Arlington, OH. The campaign consisted of education materials mailed to residences, electronic newsletter and social media communications published by the City, and a paid advertising campaign specific to Upper Arlington residents.

The results of this campaign were true to the stages outlined in this paper. With education, households demonstrated a decline in food waste generated. In fact, food waste generated by Upper Arlington households decreased by 21% between the spring and summer of 2021. Households that received additional education materials about food waste prevention and composting had a 53% reduction in wasted "edible food" (e.g., excluding pits, bones, peels).

The education campaign did not just help to decrease the waste generated. Residents reported wasting 52% less edible food than a national sample. While research shows that food waste typically increases from the spring to the summer, residents in Upper Arlington reported wasting 16% less edible food in the summer than during the spring. This was compared to a national control group, which reported a 44% increase in wasted edible food over the same time period,[5]

4.0 ENGAGEMENT

A fully optimized recycling collection and processing system cannot reach its full potential without effective education, outreach, and community engagement. It is not enough to just "tell" residents or businesses what they need to know. They must be met where they are by people they trust. These key influencers can be determined in the survey/focus group phase of a community education, engagement, and marketing plan. To be successful, the questions asked during the knowledge stage of an education campaign should be asked through the lens of behavior change; and they will help to inform the education, engagement, and outreach plan. This means setting a baseline of current behavior, determining barriers (as perceived by user groups) to change that behavior, and then determining what it will take (e.g., benefits, incentives, information) for them to change that behavior and who they need to hear it from (i.e., trusted messenger).

A trusted messenger is vital to a behavior change campaign. A message can be 100% on point, but if it does not come from someone trusted by the audience, the message may not be absorbed, and the behavior may not change. A recent study related to COVID[6] found that, if a message is introduced by a trusted messenger, that trust may relay to a new messenger when related to vulnerable audiences. It will be vital during the knowledge phase as well as the engagement phase to build relationships

[5] SWACO: *Evaluation of SMTF Campaign:* https://www.swaco.org/DocumentCenter/View/2836/Evaluating-the-Effectiveness-of-the-Save-More-Than-Food-Campaign

[6] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9932688/

with trusted messengers to a diverse range of audiences and get them on board with and test messages so that implementation has a higher chance of success.

A key component of the research phase is determining the key motivations of the target audiences, Then, during the engagement phase, prompts for behavior change can be created based on those motivations. Using the last Census as a guide for Broward County, it is likely that the focus audiences for the research phase should be English, Spanish and Haitian Creole speakers between the ages of 18 and 40 and 65 and over, both single-family home residents (rent and own) and multifamily home residents (rent and own) with a high school education and above. During the research phase, barriers to behavior change (recycling and recycling the right items) can be determined and then addressed during the education and engagement phases. To determine similar factors from businesses and institutions, a key tactic would include creating an electronic survey and sending a postcard to the businesses describing the goals and including a link to the survey. As mentioned earlier, often some sort of motivation, such as a drawing for a gift card, is needed to encourage businesses to fill out the survey. In addition, giving businesses and institutions the information they need in terms of compliance with local ordinances and regulations is a crucial step in the process. The County influences the business/institution and then key players within those locations will influence their employees or visitors in a domino effect of information and influence.

Approaching the education, engagement, and outreach plan as a behavior change campaign increases the likelihood of successfully persuading Broward County residents, businesses, and visitors to dispose of their end-of-life materials correctly.

Engaging community leaders from a wide range of special interest groups, homeowner associations, religious and service organizations, educational teams, museum staff, grocery retailers, commercial businesses, schools, as well as a diverse range of media personalities, satisfies a best practice requirement of finding someone your residents trust to deliver the most updated information.

Whether posted on a community message board, spoken about at regular meetings, mentioned during a sermon, educated on in schools, presented in a museum, or a 10-second blurb on the radio, the information meets people where they are and where they want to get their information from. When meeting with these groups, they should be asked if they have existing opportunities to distribute the information to reach as many different segments of the population as possible. If there is a “usual” way that their audience would normally get the information, inclusion of waste management information in that tool, will be effective.

By harmonizing the disposal program across jurisdictions, you also can provide consistent messaging from the County and the municipalities that participate in the program. When residents or businesses are provided with information seven to ten times a year, they are more likely to implement the desired behavior, whether by correcting the way they dispose of materials and thereby reducing contamination, or starting new behaviors, thereby increasing participation.

Jurisdictions can communicate this message via their social media channels, as inserts in utility bills, and via regular emails, to name a few. These channels cost little but go a long way toward increasing program awareness and message consistency.

If the budget allows, another best practice includes advertising to the community through social media. Short video[7] and audio messages can be created and sent to residents via social media through targeting. Targeting can be based on zip code, street address, city name, and more. The more targeted the message, the more costly it can be, but also the higher the return on investment. Traditional methods of outreach through billboards, newspaper advertisements, television, bus stops and bus wraps, and radio advertisements can also be included in approaches if adequate funds are available. These methods ensure that residents and visitors see the correct information in a convenient way, often.

Glass is Back Houston!
short video message

During the engagement phase, it is also important to work with local government recycling and disposal coordinators and brief them on the results from the knowledge phase. This provides an opportunity to discover their thoughts and experiences and also builds a relationship with them. All education and marketing materials should be reviewed by these local coordinators. After the review period, another meeting should be held with the coordinators to educate them on how to use the local government portal (see Implementation section below) and walk through the best management practices for education.

The above best practices are all complementary and work best when all are implemented as part of an integrated communication, education, engagement, and marketing plan.

[7] Houston: Glass is back video: https://www.youtube.com/watch?v=gVZxpZmu92w

Case Study – Lakeland, Florida

The City of Lakeland Solid Waste and Recycling Division had a recycling program but struggled with two significant issues: decreasing the contamination in recycling and differentiating its recycling program from the nearby Polk County program. Lakeland was seeking its own program brand that would encourage behavior change among its residents, so the City partnered with RRS to help it accomplish these goals.

RRS conducted interviews with city staff, including solid waste supervisors, customer service staff, the recycling coordinator, communications and marketing department, non-solid waste customer service, and billing staff. It participated in ride-alongs and interviews with solid waste and recycling drivers, interviewed 10 drivers, and conducted a communications audit of the current recycling promotional material.

RRS partnered with Lakeland's communications and marketing department to launch a residential survey that targeted only the city's curbside recycling and garbage service customers. The survey received 1,644 responses to questions about what items they thought should be recycled in the blue cart according to their previous flyer; confusion points were uncovered.

Residents identified what they valued most about recycling. Forty percent of respondents "realized that they were making a difference." This research led to rebranding the theme to "Every Blue Cart Makes a Difference." According to survey respondents, barriers to recycling are apathy and confusion about what to recycle. RRS also consulted a Recycling Composition Study from the previous year, which revealed that the most damaging contaminant for the recycling facility was bagged recyclables and plastic film. This is widely understood to be a common contamination in recycling, but the research gave a measurable focus for Lakeland.

For this campaign, RRS targeted single-family homeowners receiving curbside recycling service by the City of Lakeland, with an emphasis on women ages 45 and over. The goal was to distinguish the City of Lakeland's recycling program from the surrounding county while decreasing the number of plastic bags placed inside recycling carts. Two main measurable objectives of the campaign included (1) decreasing the overall recycling contamination by 5% within six months from campaign launch; and (2) changing behavior by decreasing the amount of plastic wrapping and bagged recyclables in recycling bins (this behavior change would be measured by achieving 5% of curbside service customers placing a "no plastic bags sticker" on their recycling carts within the first three months of receiving it); and (3) getting 20% of residents to recognize that recyclables should be clean, dry, and empty as per responses in a post-campaign survey.

After conducting the interviews and establishing the messaging, RRS updated the recycling webpage, produced mailers and rack cards to be used at events and left at visible locations along with double-sided magnets and door or cart hangers. For community events, RRS created a customized event tablecloth, a quiz wheel, a branded education banner, and branded giveaways.

More than 40,000 residents received a mailing from Lakeland's mayor describing the damage that is caused by bagged recyclables and encouraging residents to make a commitment to keep plastic bags out by placing a reminder sticker on their recycling carts. This was coupled with organic social media (i.e., not paid) to draw attention to the call to action and providing reusable recycling totes to residents to transport recyclables to their outdoor recycling cart.

The new campaign brand launched on *America Recycles Day* along with a webpage refresh, and press release. The recycling coordinator immediately began using the branded event display at City events until the COVID-19 pandemic curbed all events. Lakeland promoted the tote bags in honor of Earth Day, and the recycling department mailed more than 300 reusable recycling totes to residents.

The plastic bag-free campaign direct mail was launched in May of 2020, and recycling drivers were trained to hit a button in their vehicles to count every time they saw the sticker on a cart. By August 2020, the results were tabulated and Lakeland and RRS wrapped up the campaign with a media opportunity to drive traffic to a post-campaign survey.

Results – How Did We Do?

Goal 1: Decrease overall recycling contamination by five percent (5%) six months from campaign launch.

Results: According to a 2020 recycling audit at the material recovery facility, recycling contamination decreased by more than 6% overall as compared to a 2018 audit, thus exceeding the five percent goal. Several individual recycling routes boasted a 20-40% reduction in contamination with a direct correlation to those addresses with "no bagged recycling" stickers.

Goal 2. Changing behavior by decreasing the amount of bagged recyclables and plastic wrap in recycling bins as measured by 5% of residents placing a "no plastic bag sticker" on their recycling carts within the first three months of receiving it.

Results: The "Every Blue Cart Makes a Difference" recycling campaign received visible commitments from more than 5,135 Lakelanders to use plastic bag-free recycling carts by placing a sticker on their carts within a month of receiving the sticker; this represented more than 12% of residents.

Goal 3. Getting 20% of residents to recognize that recyclables should be clean, dry, and empty as per responses in a post-campaign survey.

Results: In a post-campaign survey garnering 851 responses, an average of 89% of Lakeland residents correctly identified that recyclables should be clean, dry, and empty before recycling, substantially surpassing the original 20% goal.

The campaign interviews were able to determine:

- Who could influence homeowners the most (e.g., the Mayor);
- What were barriers to putting out the recycling (e.g., getting recycling to the cart – solved with reusable tote);
- What contaminant was the biggest problem (e.g., plastic bags); and
- How to distinguish Lakeland's program from Polk County's program (i.e., chose blue recycling carts to differentiate).

Using every element of an access, knowledge, and engagement strategy, the Lakeland campaign was a resounding success.

4.1 CONTENT CREATION & EDUCATION, ENGAGEMENT, AND MARKETING PLAN IMPLEMENTATION

After determining the best messaging and messengers to reach Broward County residents through the above phases, the next best practice leads to the development of a suite of assets that will serve as the core of the Marketing campaign implementation. This includes consistent messaging on all websites and digital tools (e.g., Smart Apps, Waste Wizards) that will include information about all new disposal services (e.g., recycling, food waste, organics, bulky waste), how items should be prepared for these methods, how to prevent contamination, where items can be disposed if not collected at curbside, and when items will be collected or can be dropped off. There should be separate webpages regarding commercial and institutional disposal. The residential website should be transcreated[8] into all appropriate languages and be developed with the culturally responsive data obtained during the knowledge phase of this project.

In addition to the public facing website, the Solid Waste Authority should provide an outreach and education portal for local governments (or designated service providers) with the same information and a suite of customizable assets such as mailers/flyers, photos of individual items, in-mold labels, signs, posters, website content, newsletters, billing statements and inserts, postcards, posters, brochures, social media images, signage for drop-off centers, and commercial and multifamily recycling enclosures, decals for roll carts, and advertisements suitable for a range of media formats. The portal should also include other communications support in a toolkit, such as example

[8] Transcreation is the process of adapting content from one language to another while preserving the original intent, tone, and style. This often involves reimagining the content to make it more resonant to a new audience or market and is not an exact word-for-word translation.

messages that can be customized and used by local governments as part of the countywide campaign around waste reduction and a 12-month social media plan that can be used by any sector for any audience. Again, all assets should be transcreated into all appropriate languages. All visual disabilities should be addressed when creating all content, whether physical or digital. A portal makes it easier for any local entity to add its logo or customize any part of the written materials to work for their specific audiences.

The County should plan to have a table at all community events held within the County over a 12-month period to ensure that the messaging is getting out into the community and work with the municipalities, businesses, and institutions to show them the portals and enclosed toolkits and explain how the materials are best used. This is also an opportunity to re-engage community members worked with on the focus groups and community engagement meetings to have them influence their own circles.

Case Study – Washington, D.C.

RRS worked with Washington, D.C. on behalf of the Foodservice Packaging Institute to expand the types of items that would be included in recycling and to harmonize that list across residential and commercial recycling sectors. New to both types of recycling were pizza boxes; paper and plastic plates; cups; cup lids; to-go containers; plastic produce, deli, and bakery containers; and trays. New to commercial recycling (but previously accepted in residential) were plastic tubs; containers and lids; bulky plastic items such as milk/soda crates, buckets with metal handles, and laundry baskets; milk, juice, and soup cartons; paperbacks, telephone books, and hardback books; wrapping paper; aerosol cans; and aluminum foil and aluminum pie pans. Throughout the year, the District carried out a targeted educational campaign to inform residents and businesses of the changes. The D.C. Department of Public Works held 56 community engagement events and reached more than 12,000 residents leading up to the District's official program launch.

The communications strategy featured outreach events, presentations, a new Zero Waste DC website, a new "What Goes Where" web tool, social media, digital and print advertisements, videos, a recycling game, and new decals to encourage resident recycling behavior change.

Social media and a revived web presence proved effective tools for reaching residents. Additional educational materials such as public space ads on metro rail and bus advertisements reached a significant audience, making approximately 8.7 to 10 million impressions each.

The District followed up with a waste sort to determine if communications efforts had led to a significant change in consumer behavior when recycling foodservice packaging. The District performed a waste sort at the local MRF prior to the

launch, and another sort early the following year after the launch. The sort results showed positive results, with overall residue (including plastic film) decreasing from 33.2% to 25.8% with most other materials showing an increase in recovery. Mixed paper had the largest increase from 9.4% to 19.9%; paper containers and trays increased from 0.1% to 0.4%; and PET cups and containers increased from 0.3% to 1.6%. As a result of the campaign, D.C. witnessed higher volumes of recycling overall than the year prior, meaning that people were recycling more and were more likely to recycle correctly due to a combination of the outreach campaign and several operational improvements that D.C. undertook during this process.[9]

4.2 IMPLEMENTATION

By tailoring outreach efforts to the unique needs of each sector within the County, segmenting educational tools, and establishing robust feedback loops, the program can achieve broader participation, reduced contamination, and improved overall effectiveness in materials management.

Residents

Residential users typically prioritize convenience and clarity in recycling processes. Their needs often center on easily accessible information, such as what items can be recycled, proper sorting methods, and the location of recycling facilities. Education efforts for this group focus on simplicity, visual aids (e.g., posters, infographics), and digital tools that are intuitive and user-friendly.

A tried-and-true practice to kick off implementation of an education, engagement, and marketing plan is to share information at community events in every region of the County. The first event can be a standalone event with elected leaders speaking and inviting the press to cover it; however, it is better that the subsequent events be included in existing meetings and events. For example, setting up an information booth at a back-to-school night, a community center or library event, a religious service, etc. Providing information at existing events makes educating residents about recycling convenient, and convenience is crucial to residential recycling.

To prepare for these events, an advertising campaign should be executed in local community papers, promoted through social media marketing by targeting specific zip codes or neighborhoods, and making use of radio and television advertising spots that might be available to the County or municipalities. This kickoff event is a great opportunity to advertise the website and/or Smart App where all of the information will be available.

All events will need to have Spanish, Haitian Creole, and Sign Language interpreters for real time translations to ensure that all County audiences can interact with the education material. The objective of these events is to bring awareness of the disposal services and materials and clearly inform residents how to dispose of materials correctly. Sign-in sheets should be used at events to capture e-mail addresses and help push out information during the latter phases of the campaign.

These events will be informational in nature with simple yet comprehensive visual presentations (e.g., short

[9] Washington, D.C. Case Study – Community Partnership with FPI: https://www.recyclefsp.org/resources/washington-dc

videos, slides) along with handouts for the public to take home for easy reference. These handouts should include refrigerator magnets and mailers describing how to prepare items for disposal, how to prevent contamination, and the URL where Broward County residents can go for more information – making education clear and convenient. Staffing the "booth" with a qualified individual can also serve as a way for residents to ask questions. Another effective tool is distributing reusable grocery bags with magnets inside that educate grocery planning to aid in reducing food waste.

Schools

A key strategy for delivering complementary educational tools to households is implementing a unified school curriculum focused on teaching school-aged children proper disposal practices at school and home. These educational materials must be transcreated into the primary languages spoken within the County to ensure accessibility and inclusivity and mirror the messaging used in the main residential materials.

Several effective curriculums already exist, developed by organizations such as the U.S. Environmental Protection Agency, The Recycling Partnership, Waste Management, and The Florida Department of Environmental Protection. Broward County can leverage these resources to design a tailored curriculum after the Solid Waste Authority selects the program framework it wishes to adopt. Key to the curriculum will be the website or App that will be used by the County as a digital tool.

Integrating a recycling and reuse curriculum into classrooms is an impactful way to instill environmental stewardship in students. By teaching children the significance of recycling and reusing materials, the curriculum can help them understand how these actions conserve essential resources like water, energy, and minerals. It also educates them about the benefits of reducing reliance on raw materials, which helps protect natural resources and mitigates the environmental impacts of resource extraction.

Because today's students are tomorrow's leaders and decision-makers, instilling responsible recycling habits ensures they carry these values into the future, promoting long-term environmental sustainability. Moreover, children often share what they learn at school with their families, extending the reach of these educational efforts and encouraging sustainable practices at home.

Beyond the school system, local museums offer another valuable avenue for community education. As discussed in the engagement section, collaborating with museums to provide clear and accessible messaging can effectively reach both students and parents in an engaging environment. These relationships can also help with providing the knowledge needed for institutional visitors to dispose of the right waste in the correct containers and educating institutions on best practices around disposal (i.e., putting recycling bins next to trash bins and food waste bins to make it just as convenient to compost or recycle as to throw something away).

Measuring Success and Celebrating Achievements

As with residential recycling efforts, the success of school-based and institution-based education initiatives can be measured by reductions in landfill waste and increases in properly sorted recycling and organics. Conducting periodic waste audits is essential to track these metrics and assess program effectiveness. Conduct the baseline audit first or use a previous year's audit and then measure the same main components such as participation and contamination.

To ensure long-term success, the County can train green teams to lead curriculum implementation and conduct measurements. Recognizing and celebrating achievements, such as holding events to highlight outstanding efforts, will motivate students and reinforce positive behaviors. Students can then bring these successes home, further educating adults in their households and amplifying the program's impact.

By integrating comprehensive school curriculums, engaging community resources like museums, and focusing on measurable outcomes, Broward County can create a robust framework for fostering environmental responsibility across generations.

Commercial & Institutional

For commercial businesses, the emphasis often lies on regulatory compliance and the operational feasibility of recycling programs. Businesses need clear guidance on local regulations, efficient integration into existing operations, and resources that minimize disruptions. Engagement strategies must consider varied business sizes and sectors, tailoring information to address specific challenges such as space constraints or contamination risks.

Engaging commercial and industrial businesses at the outset of a countywide recycling program, as highlighted in the engagement section, is crucial for achieving long-term success. Establishing early connections with these businesses and involving the appropriate personnel or green teams in discussions creates a foundation for effective communication and collaboration.

Once these initial contacts are established, businesses can identify the most effective strategies for educating their employees. Onsite education, such as placing posters in strategic locations near disposal bins and break rooms, is a highly effective method of raising awareness. Partnering with human resources to integrate recycling messaging into existing communication channels—such as during special events or lunch breaks—further enhances employee engagement. Many companies in this sector may lack the knowledge or resources to initiate or sustain successful recycling practices without guidance from the County. Throughout all these educational opportunities, the County must educate the company on regulatory compliance with clear guidance and have a QR code on all materials that links with the digital tool that the County will use to educate.

To address this information gap, developing a comprehensive toolkit for businesses can significantly streamline the process. This toolkit could include templates for posters, email communications, social media posts, paycheck inserts, and onboarding modules. By providing businesses with clear, concise, and accessible resources, employees can easily understand and participate in recycling programs. Institutions, such as schools, hospitals, and government buildings, generate large-scale waste and require tailored programs that align with their operational structures. These programs might include specialized training for facility managers, custom collection systems, and ongoing support to handle high-volume waste streams effectively.

Company and institutional engagement are tied to compliance, but employee engagement can be enhanced through incentives such as branded reusable grocery bags or totes. These items not only

reinforce the business's commitment to sustainability but also extend the impact to employees' households. For example, a branded tote can help residents of multifamily buildings transport their recyclables to designated collection areas, promoting waste reduction in both residential and business sectors. Throughout all these tools, the link to the website or Smart App used by the County must be included – this serves as another way to get knowledge to residents about the right way to dispose of materials.

As with the residential sector, measuring the success of commercial and industrial recycling programs depends on key metrics: Has landfill waste decreased? Have recycling and organics recovery rates increased? And, importantly, has this been achieved with proper sorting and minimal contamination? Periodic waste audits are essential to evaluate these outcomes and to ensure the program's effectiveness. Working with the haulers that pick-up waste from these sectors will be key for measurement and engagement.

By fostering early engagement, providing practical, clear, and consistent resources, and emphasizing measurable outcomes, the County can support businesses in achieving their sustainability goals while advancing broader environmental objectives.

4.2.1 Mailers

After the events are complete, the next step will be a series of mailers. The first round should be mailed to homes with information about current disposal programs at their location, how to dispose of items correctly, and where and when to dispose of them. Mailers should include the URL or QR codes to reach the website and/or Smart App for more information. This information also can be included as an insert with utility and other bills as an educational vehicle. It should also be shared with all the community groups, organizations, businesses, and institutions on the engagement list and pushed out through social media and through media interaction.

In addition, all drop-off locations and multifamily properties should have new posters printed based on the content creation phase and made of outdoor/waterproof materials. In addition, a targeted selection of billboards, truck wraps, and/or bus wraps could be purchased directing residents and visitors to the new website for information.

Also, during this phase, all local governments should be coached by the County on social media imaging and messaging, including message frequency and the use of the available tools. While those are “free” or “organic” social media messages, the Solid Waste Authority should also enlist a paid social media marketing campaign to direct residents and visitors to the website. The paid campaign should last 12 weeks, while the organic campaign should continue throughout the year. If the County chooses the Smart App option, another round of communication to residents and businesses would be recommended with QR codes to download the app. Messages can be scheduled to go out regularly through the app to include tips on recycling, reminders of set-out days, and accepted materials. In addition, if a particular contaminant is determined because of an audit, the App can push out messaging reminding people not to put that material in their bins. Educational tools like apps (e.g., Waste Wizard, Smart Apps) will be segmented for distinct audiences. For instance:

- Residential users will receive user-friendly features like search functions for disposal methods and push notifications for pickup schedules and contaminants.

- Commercial businesses will have access to compliance checklists, waste audit tools, and sector-specific guidelines.

- Institutions will benefit from custom modules designed for high-volume waste generators, including tailored waste reduction strategies and training resources.

It is evident across all the sectors discussed that harmonizing standards and communication regarding program acceptance and implementation will reduce confusion, minimize contamination, enhance participation, and improve overall program efficiency.

4.2.2 Paid Media

A second round of paid media advertising should take place after the events (and after the baseline Waste Audit (see Section 4.3 below)) to coincide with the start of the new program and receipt of mailers. Advertisements should be placed in all local community papers, promoted through social media marketing by targeting specific zip codes, and making use of radio and television advertising spots that might be available on public channels.

After the events and coinciding with the first round of educational mailers and information and the paid media campaign, the new program should be in place. It is imperative that the initial messaging phase be repeated for several months after the events by trusted messengers to bring awareness to the new program and effectively change behavior.

About six months after the events, the next mailer should be sent to households. This mailer can highlight any issues areas that might be occurring, such as contamination or non-participation in new services. Regardless of the highlighted subject matter, the mailer will re-emphasize the new programs and services and the website where residents can find more information. The messaging across all these channels should remain concise and consistent.

4.3 MEASUREMENT AND SECOND ROUND OF ENGAGEMENT

Prior to plan execution, the County should commission a waste audit to provide a baseline to compare against future audits to determine the effectiveness of this education, engagement, and marketing plan.

Nine months after the initial phase of this plan, we recommend another 12-week paid social media campaign to re-emphasize the proper behavior and address issues that most came up at the public events as well as problem materials or lack of participation.

Between nine months and the end of the first year of program implementation, another waste audit should be conducted to compare against the baseline waste audit to measure the effectiveness of the education, engagement, and marketing program.

Finally, at the end of the first year, we recommend that, when the County sends out its calendar for the next year of pickup or drop-off or other services, the back of that mailer should again explain how to prepare items for recycling, how to prevent contamination, and provide the website and tools where residents, businesses, and institutions can obtain more information.

One month after the calendars are mailed out or one month after the waste audit (depending on the time of year), the County can conduct a Feet on the Street (FoTS) program in the top three areas shown by the waste audit to have the most contamination. For a FoTS program, hired local temporary labor, led by key experts, walk around neighborhoods to check the contents of disposal carts. The County will designate specific routes and times. The FoTS teams leave door hangers on the carts or

the doors of residences found to have contaminants, or they provide other ways to notify residents of the changes needed.

Ideally, a postcard explaining proper recycling practices will go out three to five weeks prior to FoTS, and another notice via text or email will be sent to residents the week before the FoTS program is scheduled to start, to inform residents about the program and its purpose.

After checking carts, the FoTS team should work with local programs and organizations to explain to residents about contamination so that they understand what they can and cannot place in a recycling cart or bin. It is a good idea to implement FoTS programs, in conjunction with waste audits and integrated communication programs, annually to continue to measure progress.

Three months after FoTS in targeted areas, another waste audit will help determine if contamination is decreasing.

At the end of this audit period, another electronic/mail survey of residents (and meeting with previously engaged businesses) is a best practice to determine understanding of the new programs, where to find information, and whether behavior has changed.

It is good practice to keep track of the residents on each FoTS route who were tagged for contaminated carts so that another mailer can be sent to that neighborhood to highlight a top contaminant or a top behavior that needs to be changed. After the full FoTS is completed, the route can be measured again through a waste audit. The factors that are measured to determine education success are participation and contamination. The FoTS program is a great way to foster competition between neighborhoods or communities to bring competition as a factor into improving participation and decreasing contamination.

Outreach programs can also include mechanisms for continuous feedback, such as:

- **Interactive Platforms**: Online portals (or through Smart Apps) where users can report issues, suggest improvements, or seek clarification.
- **Regular Surveys (Google Forms or Survey Monkey)**: Periodic surveys targeting specific groups to evaluate program satisfaction and gather actionable insights.
- **Community Meetings**: Scheduled sessions to discuss program outcomes and share updates directly with stakeholders (these are most effective when part of existing events).

Feedback could then be integrated with the data from waste audits, FoTS, and App/website analytics to refine messaging, tools, and services, ensuring that programs remain responsive and effective.

Case Study – Atlanta, Georgia

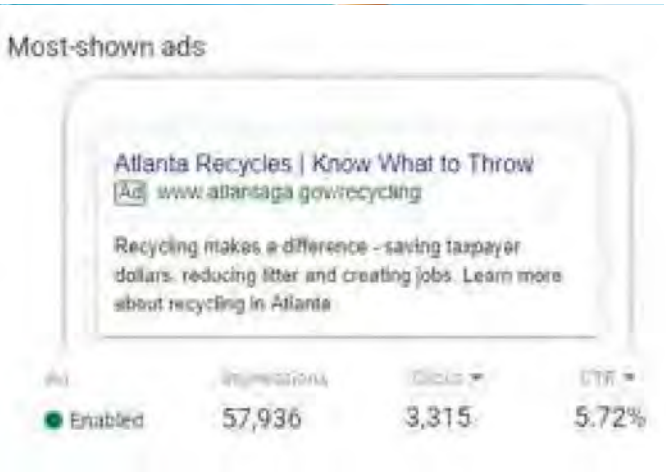
The Feet on the Street program in Atlanta was part of a multi-year, $4 million-plus project conducted by the City of Atlanta and The Recycling Partnership, and funded by The Coca-Cola Foundation, to support actions to expand recycling access for residents, reduce the presence of non-recyclable items in the recycling stream, and improve the overall recycling system. The project focused on three key opportunities to improve recycling across the city:

1. Bolstering single-family curbside participation and reducing contamination

2. Expanding multifamily recycling opportunities

3. Improving university recycling education and infrastructure

These investments enabled Atlanta to take steps to create and sustain a holistic ecosystem approach to better recycling across the City. For example, Atlanta reported a recycling contamination rate of 41% in 2017, which means that many materials collected at the curb could not be recycled. By the end of this project, the contamination rate dropped by 31%. Additionally, the recycling stream yielded 14,000 new tons. This recycling efficiency has countless environmental and system benefits.



The 2019 Feet on the Street campaign kicked off a city-wide, multi-year project to increase participation and reduce contamination. This iteration of FoTS involved tagging (Oops Tags) at all 98,000-plus single-family households in the City. There was a data-driven element to FoTS as well. The program utilized an App to record the general types of contaminated materials (e.g., plastic bags), ongoing participation rates, set-out rates, and tagging rates to identify contamination issues on the ground to focus messaging directly to residents and triage the issues. As a result of this feature, the Recycling Partnership and the City improved and strategically targeted material-specific outreach.

In tandem, the Recycling Partnership and City also launched "Know What to Throw", a recycling education campaign to raise awareness about what items to recycle. They partnered with a local materials recovery facility (MRF) to provide checks on overall material quality. In addition to social media and mailers, they used targeted advertising on social media, Google, Pandora, and local radio stations. Additionally, they placed consistent messaging on bus stops and wrapped on buses. The Recycling Partnership's research showed that Atlanta residents wanted to hear from their elected officials more than from other thought leaders on this topic. Impressively, the recycling education campaign received 7.9 million impressions.

A study commissioned by The Recycling Partnership in 2019 cataloged the results of Atlanta's citywide FoTS program through an audit halfway through the campaign. According to the study, crews

surveyed and captured 125-pound samples from a total of 70 single-family recycling truckloads, hand sorting bagged and unbagged material into 30 material categories. Results showed there was a 19% decrease in contamination for the recycling routes that had received the FoTS campaign versus those that had not yet received the FoTS tagging and education.[10]

4.4 COSTS OF ENGAGEMENT

As discussed at the first Executive Committee of the Broward County Solid Waste Authority meeting about the Solid Waste Management Plan, there is a cost to an integrated communications, education, engagement, and marketing plan. The Recycling Partnership calculated the education costs using insights gained over seven years of work. The Recycling Partnership found that addressing contamination at the curb costs about $3 to $5 per household annually, and significantly reduces material contamination. In addition, ongoing education is essential for building program knowledge and public trust, which encourages even greater participation.

The Recycling Partnership examined the true costs of education in cities of varying sizes, based on the assumption that residents need to be informed at least seven times a year to develop consistent habits (based on best practices). They also included the additional expenses necessary to raise awareness of schedules, program details, and the importance of the program in the cost estimates.

Ultimately, the Recycling Partnership estimated that an investment of $10 per household per year is required to develop and implement a new program and change behavior through education[11].

[10] The Recycling Partnership: City of Atlanta results: https://recyclingpartnership.org/recycling-atlanta-curbside/

[11] The Recycling Partnership: *Paying It Forward Report* https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2021/05/Paying-It-Forward-5.18.21-final.pdf

Appendix O

Task 17 White Paper – Construction & Demolition Debris Management Options

Solid Waste Authority of Broward County, Florida

Task 17 White Paper: Construction & Demolition Debris Management Options

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1 INTRODUCTION

Construction and demolition (C&D) debris comprises a significant portion of the overall waste stream, and managing it is vital for achieving diversion and sustainability targets. According to the U.S. Environmental Protection Agency (EPA), C&D debris generated in 2018 totaled approximately 600 million tons, more than twice the amount of municipal solid waste (MSW) produced annually. Demolition activities accounted for over 90% of the C&D debris, with construction making up the remainder.

Effective policies play a crucial role in reducing landfill reliance, increasing material recovery, and promoting circularity in the built environment. This white paper presents an overview of C&D debris management policy best practices, regulatory requirements, and opportunities to maximize waste diversion from landfills and increase recycling as part of the developing the Solid Waste and Recycling Master Plan for the Solid Waste Authority of Broward County (Broward County SWA). This paper also briefly describes the C&D policies of counties adjacent to Broward County to provide local context and inform future decision making.

THE NEED FOR EFFECTIVE C&D WASTE MANAGEMENT IN BROWARD COUNTY

C&D waste (including bulk waste) comprises approximately half of the total waste stream in Broward County. Based on the results of the visual characterization activities summarized in the Broward County 2023 Waste Characterization Study Final Report prepared by SCS Engineers, approximately 80% can be beneficially used. However, the Florida Department of Environmental Protection's (FDEP) 2023 Solid Waste Management Report reflects that less than 40% of C&D is recycled. Accordingly, the Broward County SWA has prioritized an assessment of options to increase the beneficial use of C&D, which are presented herein.

THE ROLE OF POLICY AND MARKET FORCES IN WASTE DIVERSION

C&D debris policies often incorporate financial incentives to encourage diversion or financial penalties for non-compliance with diversion targets. These policies typically are enforced through the permitting process. However, in fast-paced construction projects, contractors may prioritize avoiding project delays over meeting diversion requirements, particularly if fines are less costly than project delays.

Examples of C&D debris policies in place today include:

- Deposit programs
- Deconstruction mandates
- Disposal bans
- Green building incentives

KEY CONSIDERATIONS FOR IMPLEMENTING C&D DIVERSION POLICIES

To advance sustainable C&D management practices, communities should evaluate their current waste management landscape and explore opportunities for improved material recovery. The following questions can help guide this process:

1) **Current Practices** – How is material salvage and disposal currently managed in the community?

2) **Waste Volume & Infrastructure** – What is the scale of C&D debris generation? Can existing collection, processing, and disposal systems accommodate additional volumes of these materials if new diversion policies are implemented?

3) **Industry Capacity & Incentives** – Does the local C&D industry support material salvage? Are incentives or workforce training programs needed to enhance recovery and reuse?

4) **Market Demand** – Is there sufficient demand for salvaged and repurposed materials? What business opportunities exist for reuse?

5) **Community Engagement** – How can public awareness and stakeholder involvement be increased to support successful policy adoption and implementation?

The ordinances and programs described in this white paper serve as examples that highlight localized initiatives aimed at promoting sustainable approaches to construction and demolition.

2 FLORIDA REGULATIONS

Florida has an MSW recycling goal that includes C&D debris, which accounts for 36% of Florida's MSW stream per the most recently published data from the FDEP[1]. In 2010, the Florida Legislature recognized the importance of C&D debris recycling and adopted Section 403.706(2)(b), F.S., which directed counties to implement a program for recycling C&D debris. The Florida Legislature also adopted Section 403.707(9)(g), F.S., requiring that by January 1, 2012[2], to the extent economically feasible, all C&D debris must be processed prior to disposal. However, there is no significant enforcement of these C&D recycling requirements by the state for not meeting the spirit of the recycling goals. Despite the lack of enforcement, the statutes are recognized for significantly increasing C&D recycling rates within Florida.

Operating a C&D debris disposal facility in Florida requires obtaining a permit from the FDEP. Facilities must comply with specific design and operational standards, including the installation of liners and leachate control systems, to prevent environmental contamination. C&D facilities must report the quantities of debris recycled and disposed of, measured in tons by the county of origin, through the FDEP Business Portal.[3]

3 DEPOSIT PROGRAMS

C&D debris deposit programs serve as an incentive to reduce landfill-bound waste from construction and deconstruction projects. These programs require applicants to pay a deposit upfront, which is

[1] https://floridadep.gov/waste/waste-reduction/documents/2023-msw-composition-char
[2] https://floridadep.gov/sites/default/files/Final%20Strategic_Plan_2019%2012-13-2019_1.pdf
[3] https://floridadep.gov/waste/waste-reduction/content/construction-and-demolition-debris-recycling

refundable—either partially or fully—based on how much waste is successfully diverted. Deposit amounts and refund eligibility are determined through formulas set by each jurisdiction, ensuring that applicants understand the costs before beginning their projects. The methods for determining deposit amounts vary by location, incorporating factors such as project type, square footage, and estimated waste generation. Typically, additions and remodels have lower deposit rates due to limited recycling opportunities, whereas new construction projects require higher deposits since waste diversion can be planned throughout the process. To receive a refund, ordinances require that projects meet specific waste diversion targets, which may include an overall diversion rate and recovery of specific recyclable materials. Applicants must track their waste disposal throughout the project, often using software tools like Green Halo or spreadsheet templates provided by the jurisdiction. Some communities allocate forfeited or unclaimed deposit funds toward sustainability initiatives.

LEE COUNTY, FLORIDA

Lee County's C&D Debris Recycling Program, established in 2007 under Ordinance #07-25 (**Appendix A**), aims to reduce the environmental impact of construction and demolition activities by diverting debris from landfills through salvaging, reusing, and recycling materials.[4] The ordinance has been effective at diverting material from disposal; the most recently published FDEP Annual Solid Waste Management Report for 2023 (**Appendix B**) shows that Lee County has a 97% C&D recycling rate, the highest of any county in Florida.[5]

Applicability: The ordinance applies to various construction and demolition projects, including residential and commercial construction exceeding certain values, alterations, and roofing projects that involve the removal of old roofing materials.

Diversion Goals: Contractors and homeowners are required to divert at least 50% of the waste generated during these projects. This can be achieved through methods such as on-site reuse, recycling, or delivering materials to county-approved recycling facilities.

Deposit Fee: To encourage compliance, a diversion fee is imposed, calculated based on the project's type and scope. For example, roofing projects may have a fee of $100, residential homes $300, and commercial projects less than 10,000 square feet $500. These fees are refunded upon meeting the diversion requirements.

Deconstruction Consideration: For projects involving the removal of existing structures, the ordinance encourages deconstruction (careful dismantling for material reuse) over demolition, whenever feasible, to maximize material recovery.

SAN JOSE, CALIFORNIA

The City of San Jose has also implemented a Construction and Demolition Diversion Deposit (CDDD) program to promote recycling and diversion of C&D debris from landfills[6] (**Appendix C**). Established under San Jose Municipal Code section 9.10, part 15, this program applies to:

1) All residential alterations with a valuation of $2,000 or more.

[4] https://www.leegov.com/solidwaste/constructiondebris
[5] https://floridadep.gov/waste/waste-reduction/documents/2023-cd-white-goods-tires
[6] https://www.sanjoseca.gov/your-government/departments-offices/environmental-services/recycling-garbage/construction-demolition-debris/building-permit-holders/construction-and-demolition-diversion-deposit-cddd

2) All non-residential alterations with a valuation of $5,000 or more.
3) All residential and non-residential demolitions.

Diversion Rate: A minimum of 50% of the C&D debris must be diverted from landfills. Note that Alternative Daily Cover (ADC) does not count toward the diversion rate.

Deposit Structure: A deposit is charged based on the building's square footage. This deposit is refundable upon demonstrating compliance with the diversion requirements. Forfeited or unclaimed deposit funds are used to develop waste diversion infrastructure and support environmental programs that improve local sustainability efforts.

Diversion Methods: Permit holders can divert materials by:

1) Hauling recyclable materials themselves to a city-certified C&D facility.
2) Hiring a city-permitted debris box company to transport materials to a certified facility.

PLANO, TEXAS

The City of Plano established a C&D Debris Recycling Deposit Program to encourage builders and contractors to divert waste from landfills through recycling and reuse.[7] This program offers financial incentives in the form of refundable deposits, promoting sustainable construction practices within the community. (See **Appendices D, E, and F**)

Deposit Requirements: The program applies to specific construction projects based on their type and size. Deposits are calculated per square foot, with rates varying by project type:

Project Type	Square Footage Threshold	Deposit per Square Foot
Addition/Alteration/Remodel	10,000+	$0.15
Demolition	5,000+	$0.20
New Construction	5,000+	$0.25

The maximum deposit for any eligible project is $11,250.

Diversion Rate and Refunds: Refunds are prorated based on the percentage of C&D debris diverted from landfills:

Diversion Rate	Alteration/ Remodel Refund	Demolition/ New Construction Refund
30%	100%	100%
25%	90%	90%
20%	80%	80%
15%	70%	70%
10%	50%	50%

Forfeited or unclaimed deposit funds are used to develop waste diversion infrastructure and support environmental programs that improve local sustainability efforts.

[7] https://www.plano.gov/573/Construction-and-Demolition-Recycling

Applicable Projects:

1) Alterations or remodels of 10,000 square feet or more.
2) New construction and demolitions of 5,000 square feet or more.

Exempt Projects:

1) Alterations/remodels less than 10,000 square feet.
2) New constructions and demolitions less than 5,000 square feet.
3) Prefabricated enclosures or structures without foundations or structural modifications.
4) New and replacement roofing projects.
5) Projects requiring only mechanical, electrical, plumbing, or HVAC permits.
6) Swimming pools, hot tubs, patios, and sunrooms.

Recyclable C&D materials include:

- Asphalt shingles (residential)
- Brick and stone
- Carpet and tile
- Ceiling tiles
- Concrete debris (clean) and concrete washout
- Metals (aluminum, copper, tin, and steel)
- Wood materials, including pallets
- Brush and tree debris
- Sheetrock

Approved Haulers and Facilities: The City of Plano maintains a list of permitted recycling haulers and facilities authorized to process C&D materials. Contractors must utilize these approved services to ensure compliance with program requirements.

BOULDER, COLORADO

The City of Boulder implemented a Sustainable Deconstruction Ordinance (**Appendix G**) to promote environmental sustainability by diverting C&D debris from landfills.[8] This ordinance mandates that certain demolition and major remodeling projects adhere to deconstruction and recycling requirements.

Applicable Projects: The ordinance applies to all full structure removal and major remodeling projects, referred to as Level 4 alterations.

Diversion Goals: Projects must divert at least 75% of materials generated from deconstruction, including concrete and asphalt, by weight. A minimum of three material types (e.g., glass, metal, structural wood, electronics) must be diverted from the landfill.

Deconstruction Plan: Before applying for a demolition permit, a Sustainable Deconstruction Plan must be submitted that outlines the deconstruction process, identifies the waste recycling manager, estimates diversion rates, and details the materials to be salvaged, reused, or recycled.

[8] https://bouldercolorado.gov/services/sustainable-deconstruction-requirements

Refundable Deconstruction Deposit: A deposit of $1 per square foot of the structure being demolished is required, with a minimum deposit of $1,500. This deposit is refundable upon meeting diversion requirements.

Non-Refundable Administrative Fee: A fee of $219 is charged to cover administrative costs associated with processing the deconstruction plan.

Deconstruction Process:

- Pre-Project (Permit Approval):
  - Develop a Sustainable Deconstruction Plan detailing the deconstruction strategy, waste management, and diversion goals.
  - Submit the plan through the Customer Self-Service Portal for review and approval.
  - Pay the refundable deposit and non-refundable administrative fee to obtain the demolition permit.

- During Project:
  - Track all diverted materials, maintaining weight tickets for landfill, recycling, and donation facilities.
  - Enter diversion data into the C&D Debris Diversion Tracking Form.
  - Provide documentation for materials lacking weight tickets, including photographs, estimated volumes, destination, and number of hauling trips.

For new construction projects, Boulder requires:

1) A 2-page application describing the project and identifying recycled content
2) 100% recycling of clean wood, metal, and cardboard
3) Completed waste diversion tracking spreadsheet

4 DECONSTRUCTION MANDATES

Deconstruction mandates are policies that require buildings to be carefully dismantled rather than demolished, with the goal of maximizing material recovery and reducing waste. Unlike traditional demolition, which sends most materials to landfills, deconstruction prioritizes salvaging reusable materials such as wood, fixtures, doors, and architectural elements. These mandates are typically applied to older buildings or projects of a certain size and are designed to support waste diversion goals, reduce environmental impact, and promote a circular economy. By requiring systematic disassembly, deconstruction mandates help cities and communities preserve valuable materials, create jobs in the reuse sector, and lower carbon emissions associated with new material production.

PORTLAND, OREGON

The City of Portland has a Deconstruction Ordinance (**Appendix H**) that mandates that certain residential structures be deconstructed rather than demolished to promote material salvage and environmental sustainability.[9]

Scope: Initially adopted in 2016, the ordinance was one of the first in the United States to require deconstruction for single-dwelling structures (houses and duplexes). The ordinance was applicable to

[9] https://www.portland.gov/bps/climate-action/decon/deconstruction-requirements

houses and duplexes built in 1916 or earlier, or those designated as historic resources subject to demolition review or a 120-day delay. Effective January 20, 2020, the ordinance was expanded to include structures built in 1940 or earlier.

Requirements: Deconstruction must be performed by a Certified Deconstruction Contractor trained in safely dismantling structures and salvaging materials for reuse. Prior to permit issuance, the selected contractor must submit a Pre-Deconstruction Form. Upon project completion, a Post-Deconstruction Form detailing salvaged materials, along with receipts for salvaged, recycled, or disposed items, must be submitted and approved by the Bureau of Planning and Sustainability (BPS) before final inspections can proceed.

Penalties: Demolition permit will not be issued without Certified Deconstruction Contractor submitting a Pre-Deconstruction Form. The penalty for the first violation is $500; second violation = $1,000; third violation = $1,500. Penalties may be imposed on a per month, per day, or per incident basis. Improper use of heavy machinery may be subject to a penalty of up to $10,000.

Benefits: The ordinance aims to divert approximately 8 million pounds (4,000 tons) of materials from landfills annually, preserving valuable resources and reducing environmental impact. It also seeks to create job opportunities that serve as pathways to construction careers and increase the likelihood of safely identifying and removing materials containing lead and asbestos.

PALO ALTO, CALIFORNIA

The City of Palo Alto banned demolition as of 2020 and currently requires deconstruction, defined as the careful disassembly of building components to maximize reuse and recycling.[10] Residential and commercial projects where structures are completely removed (also known as "demolition") must conduct a survey of materials and comply with deconstruction, salvage for reuse, and source separation requirements. The city also requires a separate building permit for the removal of structures (previously known as a "demolition" permit), and all deconstruction and construction projects are required to utilize a city approved reuse organization for the collection of all materials if using containers (bins or debris boxes) at project sites. (See **Appendix I**)

5 DISPOSAL BANS

C&D disposal bans are regulations that prohibit certain materials generated during construction, renovation, or demolition projects from being sent to landfills. These bans are designed to divert valuable and recyclable materials, such as concrete, asphalt, wood, and metals, from the waste stream, encouraging their recovery, reuse, and recycling. The primary goal of C&D disposal bans is to reduce the environmental impact of construction activities by minimizing landfill waste, conserving natural resources, and promoting a more sustainable approach to construction materials. These bans also help cities and regions meet waste diversion targets, support circular economy initiatives, and reduce the carbon footprint associated with manufacturing new materials.

AUSTIN, TEXAS

As of 2015, building permits for projects involving more than 5,000 square feet of new, added, or remodeled floor area are subject to the City of Austin's C&D debris ordinance[11] (**Appendix J**). In

[10] https://www.cityofpaloalto.org/Departments/Public-Works/Zero-Waste/Zero-Waste-Requirements-Guidelines/Deconstruction-Ordinance

[11] https://www.austintexas.gov/cd

2019, the ordinance was expanded to include all commercial and multi-family demolition projects. Under these regulations, project sites must recycle at least 50% of the debris generated or ensure that no more than 2.5 pounds of debris per square foot is disposed of. Over time, the ordinance has been designed to increase diversion rates while gradually decreasing the square footage threshold for compliance.

To meet reporting requirements, permit holders must submit a weight ticket summary spreadsheet documenting compliance. Certain materials, including excavated soil, stone, land-clearing debris, special waste, and hazardous materials such as asbestos and lead-containing materials, are exempt from these requirements. Non-compliance may result in penalties, including a Class C misdemeanor and fines of up to $500 per day, per offense. However, city staff have noted that compliance remains low without an enforcement mechanism, such as a deposit requirement. As of 2024, the submission rate for weight ticket summaries stands at 64%, while overall compliance with the ordinance is at 58%.

MASSACHUSETTS

The Massachusetts Department of Environmental Protection (MassDEP) has implemented a disposal ban on several key C&D materials, including asphalt pavement, brick, concrete, metal, wood, and gypsum wallboard[12] (see **Appendix K**). These materials are prohibited from being disposed of in landfills and must instead be diverted for recycling or reuse. Note that wood may be disposed of at municipal waste combustion facilities. The ban is designed to reduce landfill waste, promote material recovery, and support the state's waste reduction and circular economy goals. Increasing recycling and other diversion of C&D materials helps support development of in-state processing businesses and preserves valuable, limited disposal capacity in the Commonwealth. MassDEP's Draft 2030 Solid Waste Master Plan (SWMP) sets a goal of reducing disposal of C&D materials by 260,000 tons by 2030, which is more than double the current C&D recycling tonnage. Compliance is enforced through waste facility inspections, and violators may face fines or other penalties. The waste bans are located in the state's solid waste facility management regulations at 310 CMR 19.017.

MassDEP collaborated with a C&D Debris Subcommittee to establish the disposal ban on certain materials. This subcommittee included a diverse group of stakeholders, such as architects, engineers, building owners, contractors, haulers, C&D processors, landfill and transfer station operators, municipalities, environmental organizations, trade associations, law firms, and consultants. Through their work, the subcommittee determined that viable recycling and reuse markets exist for materials like asphalt pavement, brick, concrete, metal, wood, and clean gypsum wallboard. These materials are commonly diverted from disposal, reinforcing the feasibility of the ban.

SEATTLE, WASHINGTON

The City of Seattle bans the disposal of asphalt paving, bricks, concrete, metal, cardboard, gypsum scrap, and clean wood in garbage containers or transfer stations, requiring these materials to be taken to certified C&D recycling facilities[13] (**Appendix L**). Exceptions apply for small quantities,

[12] https://www.mass.gov/guides/massdep-waste-disposal-bans

[13] https://www.seattle.gov/utilities/construction-resources/collection-and-disposal/construction-and-demolition

painted materials, or those containing hazardous substances. Seattle Public Utilities (SPU) enforces compliance through inspections, though further bans are on hold due to limited recycling markets.

To encourage material recovery, Seattle requires salvage assessments before demolition or major renovations. These assessments identify reusable materials such as clean wood, siding, roofing, plumbing fixtures, and lighting. Any demolition or alteration project over 750 square feet or valued at $75,000+ must complete an assessment to obtain a building permit. Owners or their representatives can conduct assessments for alterations, while whole-building demolitions require a certified salvage verifier with expertise in reuse markets.

Additionally, all demolition, new construction, and large alteration projects (750+ square feet or $75,000+ value) must submit a Waste Diversion Report to SPU after completion. These reports track the amount of C&D material salvaged, recycled, or sent to a landfill. As of January 2014, all projects must submit an electronic Waste Diversion Report to the city within 60 days of Final Inspection Approval. SPU conducts random audits to ensure compliance, verifying reports for accuracy and checking that materials were delivered to approved facilities.

Beginning in October 2022, Seattle started a new pilot program to incentivize deconstruction projects with the goal of increasing familiarity with the process, gather useful data on the program, and identify best practices. The pilot program defines eligible projects and provides the following financial incentives: residential deconstruction at $4,000 per house; residential garage deconstruction at $500 per garage; and commercial deconstruction at $6,000 per commercial project.[14]

6 GREEN BUILDING POLICIES

Many local governments have implemented a variety of green building policies aimed at encouraging a more sustainable built environment, such as requiring government facilities to be constructed to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) standards. LEED is the most widely utilized green building rating system in the world and can be applied to nearly all building types.[15] Participating construction projects can achieve different levels of certification based on the number of points awarded by the system, ranging from LEED certified, Silver, and Gold, with Platinum being the highest designation. Although initially focused on promoting more energy efficient buildings, as the rating system has evolved it has increasingly incorporated higher standards for the utilization of recycled content in building construction and more stringent recycling requirements for C&D as further described below. Local governments mandating that government facilities be constructed to meet green building certification can help shape local C&D recycling markets by generating demand while also demonstrating a highly visible public commitment to increasing sustainability.

[14] https://www.seattle.gov/utilities/construction-resources/collection-and-disposal/construction-and-demolition/deconstruction

[15] https://support.usgbc.org/hc/en-us/articles/4404406912403-What-is-LEED-certification#:~:text=LEED%20(Leadership%20in%20Energy%20and,rating%20system%20in%20the%20world.

LEED CREDITS

The Materials and Resources (MR) category in LEED v4 for Building Design and Construction (BD+C) encourages sustainable material sourcing, waste reduction, and recycling throughout a building's lifecycle.[16] Specific requirements within this category include:

- **Construction and Demolition Waste Management (MR Credit 2)** requires a waste diversion plan and diversion of at least 50% of construction and demolition waste from landfills through recycling, reuse, or other diversion methods. Higher diversion rates earn more points. The goal is to reduce construction waste and manage it more sustainably.

- **Material Reuse (MR Credit 4)** rewards projects for reusing existing building materials, such as structural elements, interior materials, or other components that can be integrated into the new building design. The project must demonstrate that a percentage of the total building materials (measured by cost or weight) are reused. LEED v4 requires that a minimum of 5% (by cost) of the materials used in the project must come from reused sources to achieve this credit. A higher percentage of reused materials can earn additional points:

    - 1 point for 5% of the materials (by cost) reused.
    - 2 points for 10% of the materials (by cost) reused.

  Projects must provide documentation to verify that materials being reused meet the credit requirements. This includes a list of materials being reused and their origin; cost breakdown or weight calculations showing the amount of reused materials relative to the total materials used in the project; and certifications or tracking systems (e.g., deconstruction and salvage plans) that show how the materials were reclaimed, cleaned, and integrated into the new design. The documentation must prove that the reused materials were not waste, but materials previously used in a functional building component.

Examples of Cities with LEED Requirements

Coral Gables, Forida: The City of Coral Gables requires all newly constructed buildings over 20,000 square feet to be LEED certified.[17]

Miami, Forida: The City of Miami adopted Municipal Code Ordinance Article III in 2009 requiring all new private construction over 50,000 square feet to achieve LEED Silver while also providing density bonuses for developments that achieve LEED Gold or Platinum.[18]

New York City, New York: New York City has implemented several green building laws, such as Local Law 86 and Local Law 32, which require city-funded projects to meet specific sustainability standards, often including LEED certification.[19,20] NYC also has a Green Building Standards law,

[16] https://www.usgbc.org/guide/bdc
[17] https://www.coralgables.com/department/sustainability
[18] https://www.miami.gov/My-Government/Climate-Change-in-the-City-of-Miami/Buildings-and-Land-Use#:~:text=Per%20Section%203.13.,must%20be%20LEED%20Silver%20certified.
[19] https://www.nyc.gov/site/ddc/about/sustainable-design-local-law-86.page
[20] https://www.nyc.gov/assets/oec/CGBP-Documents/MOEC-CGBP_Overview%20Fact%20Sheet.pdf

which mandates that buildings undergo energy efficiency upgrades and meet specific sustainable building practices, with LEED being a recognized compliance pathway.[21]

Washington, DC: The Green Building Act of 2006 (GBA) requires that all non-residential District public buildings meet the U.S. Green Building Council's LEED certification standards for environmental performance at the Silver level or higher.[22] This includes buildings owned or funded by the city. In some cases, private developers are also incentivized to pursue LEED certification through zoning allowances or tax credits.

San Francisco, California: San Francisco has a Green Building Ordinance that mandates LEED Gold certification (or equivalent) for all new commercial and residential buildings over a certain size (typically 50,000 square feet and larger).[23] The city also has a policy encouraging private developers to pursue LEED certification for new buildings.

Chicago, Illinois: Chicago encourages private developers to pursue LEED certification through zoning bonuses and an Express Permitting Program.[24, 25]

Seattle, Washington: Seattle has adopted a policy requiring LEED certification for all city-owned and city-funded buildings. Private developers are also encouraged to meet LEED standards through incentives like expedited permitting. [26]

Los Angeles, California: Los Angeles requires LEED Silver certification for new city-owned or city-funded projects, with a preference for higher certifications like LEED Gold or Platinum. The city also offers incentives for private projects to achieve LEED certification, especially in urban areas with higher environmental impact.[27]

Portland, Oregon: Portland has a Green Building Policy that requires public buildings to be LEED Gold certified or higher. The city also promotes the use of LEED for private sector projects through incentives and support.[28]

Boston, Massachusetts: Boston's Green Building Policy requires LEED Gold certification for all large municipal projects (generally over 50,000 square feet). Private developers are also encouraged to meet LEED standards with incentives.[29]

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[21] https://www.nyc.gov/site/oec/green-building/green-building-laws-regulations.page#:~:text=Known%20as%20Local%20Law%2086,the%20New%20York%20City%20Council.
[22] https://doee.dc.gov/publication/green-building-act-2006
[23] https://www.sfenvironment.org/green-building-ordinance-sf-building-code
[24] https://www.chicago.gov/city/en/sites/sustainable-development-policy/home.html
[25] https://www.chicago.gov/city/en/depts/bldgs/provdrs/permits/svcs/express-permits.html
[26] https://www.seattle.gov/environment/climate-change/buildings-and-energy/city-facilities/sustainable-buildings
[27] https://planning.lacity.gov/odocument/9e49503d-edb8-4311-8d2f-6702e0a2d04f/Standard_of_Sustainable_Excellence_Instructions_Project_filed_BEFORE_1-1-11.pdf
[28] https://programs.dsireusa.org/system/program/detail/254
[29] https://www.boston.gov/sites/default/files/embed/b/boston2030_chapter_7_green_and_sustainable_housing_0.pdf

7 POLICY REVIEW OF FLORIDA JURISDICTIONS

To better understand the C&D regulatory approach taken by local governments in Florida, the policies of some of the counties with the highest C&D recycling rates were reviewed in addition to Broward County's neighboring jurisdictions. C&D facilities are required to report the quantities of materials recycled and disposed of, measured in tons by the county of origin, through the Florida DEP Business Portal with the data being used to compile recycling rates for each county in Florida[30]. The 2023 DEP Annual Solid Waste Management Report demonstrates that some counties in Florida are achieving commendable C&D recycling rates, although there is no consensus among the top performing jurisdictions in regard to C&D policy implementation. **Appendix B** lists the C&D recycling rates of each Florida County in 2023.

Lee County (97%)

Lee County boasts an impressive 97% C&D recycling rate that is attributed to their implementation of a C&D recycling ordinance in 2007, as described in detail in the section above on C&D deposit programs. Lee County has the highest C&D recycling rate of any Florida county per the most recently published DEP reporting and serves as a good model for policy development in Broward County.

Escambia County (90%)

Escambia County has the second highest C&D recycling rate in Florida, although there is no ordinance requiring C&D recycling at the county level or by the City of Pensacola, which is the largest incorporated municipality within the county. Per discussions with their staff and the information available in online reports, Escambia County stockpiles concrete and asphalt at their landfill and has a contractor visit the facility once or twice a year to crush the material which is then used as an aggregate road base onsite at the landfill. The county also utilizes a significant amount of treated contaminated soil and C&D waste as alternative daily cover on the landfill, which does not divert waste from the landfill, but is counted as recycling per current DEP methodology. Given the presence of private C&D processing facilities in Broward County and the goal to divert 75% of waste from disposal, the practice of alternative daily cover is not as desirable compared to adopting policies that lead to more material recovery, however such practices can significantly boost recycling rates under DEP's current reporting methodology.

Citrus County (85%)

Citrus County also does not have a C&D recycling ordinance in place, however similar to Escambia County, they have partnered with a private contractor to crush clean concrete accepted at the county landfill to provide a 2" minus aggregate material that is used internally onsite while also recovering scrap metal. The county also relies on several private sector C&D recycling efforts, which are captured in the county's annual reporting to DEP.

Palm Beach County (81%)

C&D recycling is voluntary in Palm Beach County; however, the Solid Waste Authority of Palm Beach County strongly encourages recycling by having a program whereby the county requires permitted recycling facilities to achieve a minimum 50% recycling rate as a condition of their permit pursuant to Rule 1, which is presented in **Appendix M**. [31]. C&D can be delivered to the private permitted C&D

[30] https://floridadep.gov/waste/waste-reduction/content/construction-and-demolition-debris-recycling
[31] https://www.swa.org/708/Private-Permitted-Facilities

processing facilities or the landfill where customers separate material into different waste streams to maximize recovery. The Solid Waste Authority of Palm Beach County estimates they successfully recycle 35%-40% of C&D materials brought to the landfill. They also maintain an updated list of permitted C&D recycling facilities on their website to make it easier for the public to identify recycling and disposal locations.

Sarasota County (81%)

C&D recycling is mandatory in the unincorporated portions of Sarasota County via Ordinance No. 2022-069 (**Appendix N**). Sarasota County provides for recycling of C&D materials at its Central County Landfill and used to require a private contractor operating the C&D processing facility to achieve 50% recycling by weight, however the ordinance was amended in 2022 to redefine "Construction and Demolition Debris Recycling Facility" to remove recycling from the defined term (i.e. "Construction and Demolition Debris Facility") and deleted language under the definition that the facilities, "provides evidence that it recycles at least 50 percent by weight of the Recyclable C&D Debris delivered to the facility", instead adding language recycling should be performed, "to the extent economically feasible, to remove Recyclable Material prior to disposal[32]". The County stives to recycle C&D at its landfill "as markets allow" and provides a list of targeted materials for recovery on its website.

Miami-Dade (40%)

Miami-Dade County does not have a C&D recycling related ordinance, however the county published a Climate Action Strategy in 2021, which includes a community recommendation to: "Implement best practices to reduce and recycle construction and demolition waste, including requiring pre-construction waste management plans"[33]. The county also offers households the ability to recycle portions of C&D materials at their neighborhood trash and recycling centers, but volume is limited to three cubic yards of C&D per customer, per day.

8 CONCLUSION AND RECOMMENDATIONS

As evidenced by the options presented herein, there are a variety of mechanisms to manage C&D debris, each with advantages and disadvantages and with varying degrees of regulatory influence and oversight. Ultimately, it is a policy matter to implement the approach that best aligns with the goals of the Broward County SWA. Given the volume of C&D materials generated in Broward County and the projected growth in population and waste generation identified by the Solid Waste Mass Balance model produced as part of the Task 2 White Paper, the SWA would be well served by enacting formal C&D recycling ordinances to drive increased waste diversion towards achieving the 75% waste diversion goal. There are several potential policy frameworks to consider as detailed above and it is recommended that the Authority begin a formal process to engage with the development and permitting departments of Broward County and municipal members of the Authority to determine which approach is most appropriate and preferred by the Authority's members. Additionally, it is recommended that the Authority further engage with Lee, Sarasota, and Palm Beach counties to speak with their solid waste department leadership regarding how their programs are functioning, identify lessons learned, and request more detailed information on the costs associated with enforcing and administering their respective programs.

[32] https://www.scgov.net/government/solid-waste/construction-and-demolition
[33] https://www.miamidade.gov/global/economy/resilience/climate-strategy/water-waste-approach-7.page

9 ADDITIONAL RESOURCES

1. **Urban Sustainability Directors Network (USDN) - Encouraging and Mandating Building Deconstruction**
   - Description: Value proposition, potential city roles, challenges and potential solutions, evaluation/effectiveness, further resources.
   - Link: https://sustainableconsumption.usdn.org/initiatives-list/encouraging-and-mandating-building-deconstruction

2. **US EPA -Deconstruction Manuals for Construction and Demolition (C&D) Projects**
   - Description: Manuals that provide guidance on designing buildings to facilitate deconstruction and deconstructing buildings to reduce the disposal of reusable C&D materials.
   - Link: https://www.epa.gov/smm/deconstruction-manuals-construction-and-demolition-cd-projects

3. **US EPA -Large-Scale Residential Demolition -Reuse and Recycling Opportunities and Demolition**
   - Description: Deconstruction and reuse, recycling, markets, greening vacant lots
   - Link: https://www.epa.gov/large-scale-residential-demolition/reuse-and-recycling-opportunities-and-demolition#deconstruction

4. **Colorado Construction, Demolition & Deconstruction Policy Toolkit (2023)**
   - Description: "The toolkit can assist local government staff and policymakers in developing diversion programs for the built environment which significantly contributes to climate and zero waste planning efforts. The toolkit provides a step-by-step process to develop policies to manage C&D materials -from research through policy development, program implementation and ongoing management."
   - Link (scroll to "C&D Policy Toolkit"): https://www.recyclecolorado.org/index.php?option=com_content&view=article&id=98:c-d-council&catid=20:site-content&Itemid=202#CDInfo

5. **Which Buildings are "Worth" Disassembling? An Analysis of American Deconstruction Ordinances (Wyeth Augustine-Marceil, 2023)**
   - Description: "Through interviews with local representatives, analysis of ordinance language, and review of city progress reports, this research explores the origins of the ordinances, the thinking that shaped them, and their eventual outcomes. This work provides a survey of American ordinances, challenges prevailing assumptions, and provides recommendations for other municipalities considering deconstruction."
   - Link: https://ecommons.cornell.edu/handle/1813/113151

6. **Ithaca CROWD Deconstruction Local Policy Guide (2023)**
   - Description: Recommendations to support deconstruction; best practices in salvage, reuse, and deconstruction; draft sustainable deconstruction resolution; model deconstruction, salvage, and reuse ordinance.

- Link: https://labs.aap.cornell.edu/just-places-lab/publications

7. **Energy Justice**
   - Description: Resources on C&D debris, deconstruction, and building material reuse
   - Link: https://energyjustice.net/waste/cd/

Appendix A

Lee County, Florida, C&D Recycling Ordinance

LEE COUNTY ORDINANCE NO. 07-25

AN ORDINANCE RELATING TO MANDATORY RECYCLING OF COMMERCIAL AND MULTI-FAMILY RESIDENTIAL SOLID WASTE, AND CONSTRUCTION AND DEMOLITION DEBRIS; PROVIDING FOR PURPOSE AND SCOPE OF ORDINANCE; PROVIDING FOR DEFINITIONS; PROVIDING FOR BUSINESS RECYCLING REQUIREMENTS; PROVIDING FOR MULTI-FAMILY RECYCLING REQUIREMENTS; PROVIDING FOR CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING REQUIREMENTS; PROVIDING FOR CHANGES TO FEES AND PENALTIES; PROVIDING FOR CONFLICTS OF LAW, SEVERABILITY, CODIFICATION, INCLUSION IN CODE AND SCRIVENER'S ERRORS, AND EFFECTIVE DATE.

WHEREAS, the Board of County Commissioners of Lee County is the governing body in and for Lee County, Florida; and

WHEREAS, the Board of County Commissioners of Lee County, Florida is authorized pursuant to Chapter 125; Florida Statutes, to enact Ordinances necessary in the exercise of its powers; and

WHEREAS, Lee County is responsible pursuant to Chapter 403, Florida Statutes, for the proper disposal of all solid waste generated in the County; and

WHEREAS, collection of recyclables is beneficial to the environment through the reuse and/or recycling of recovered materials; and

WHEREAS, Lee County finds that mandatory recycling of commercial and multi-family residential solid waste, and construction and demolition debris will extend the life of County operated landfills and waste-to-energy facilities.

NOW THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF LEE COUNTY, FLORIDA, that:

SECTION 1: PURPOSE AND SCOPE OF ORDINANCE

A. The purpose of this Ordinance is to establish mandatory recycling to ensure that recyclable materials generated and accumulated by multi-family properties, commercial establishments, and construction and demolition activities be source separated and collected from the solid waste so that such recyclable materials are not deposited at a landfill, but are processed and reused.

B. Lee County requires that all businesses and multi-family properties in unincorporated Lee County must provide sufficient on-site recycling services. Under this requirement, business properties must continue to use the designated franchise hauler for refuse collection for their service area and shall choose a service provider and negotiate prices for recycling services. Multi-family properties shall utilize the designated franchise hauler for collection of recycling materials required under this Ordinance. The Recycling guidelines contained within this document are intended to articulate the standards and expectations for commercial and multi-family recyclables collection. Commercial businesses on minimum refuse service as defined by the Solid Waste Division are exempt from the requirements of this Ordinance. Construction and demolition activities may select any service provider and negotiate prices for recycling services.

SECTION 2: DEFINITIONS

For the purposes of this Ordinance, the definitions contained in this Section shall apply unless otherwise specifically stated. When consistent with the context, words used in the present tense include the future, words in the plural include the singular and words in the singular include the plural. The words "shall" or "will" are mandatory and not discretionary. For further clarification of definitions, refer to Section 403.703, Florida Statutes, and Fla. Admin. Code R. 62-701.200 as either may be amended from time to time and is incorporated herein by reference.

In the event of any conflict between a definition as made in this Ordinance and one contained in either Section 403.703, Florida Statutes, or Fla. Admin. Code R. 62-701.200, as either may be amended from time to time, the statutory or administrative definition shall control.

A. **Advanced Disposal Fee** shall mean a fee imposed upon commercial entities or properties for failure to comply with the requirements of this Ordinance.

B. **Agreement** shall mean the franchise agreements executed by the County and awarded to certain collection contractors.

C. **Board** shall mean the Board of County Commissioners of Lee County, Florida.

D. **Business** or **Commercial Business** means any business, proprietorship, firm, partnership, person in representative or fiduciary capacity, association, venture, trust, governmental office, educational facility, corporation which is organized for financial gain or for profit, or non-profit

corporation or entity, including all commercial, governmental, industrial, and institutional entities.

E. **Certified Recycling Facility** means a recycling, composting, materials recovery or re-use facility for which the Director has identified as compliant with the intent of this Ordinance

F. **Collect** or **Collection** includes accept, accumulate, store, process, transport, market or dispose of as required by County Ordinance, state and federal law.

G. **Collection System** (1) for business properties means a system which includes the following components: (a) receptacles for individual employees and/or centrally located receptacles expressly for the collection and storage of recyclable materials separated by employees; (b) a contract with a hauler for collection of the recyclable materials and transport to a recycling processor or end-user, or proof of self-haul to a permitted material recycling facility; and (c) educational materials to inform employees of how to properly use collection receptacles; and (2) for multi-family properties means a system that includes the following components: (a) at-the-unit or centrally located receptacles expressly for the collection and storage of recyclable materials separated by tenants; (b) a contract with a hauler for collection of the recyclable materials and transport to a recycling processor or end-user, or proof of self-haul to a permitted material recycling facility; and (c) educational materials to inform tenants of how to properly use collection receptacles.

H. **Construction** means the building of any facility or structure or any portion thereof including any tenant improvements to a previously unoccupied existing facility or structure. "Construction" does not include a project limited to interior plumbing work, electrical work or mechanical work.

I. **Construction and Demolition Debris** or C&D means used or commonly discarded materials removed from premises of a Covered Project during construction, remodeling, repair, demolition, deconstruction or renovation resulting from construction, renovation, remodeling, repair, deconstruction, or demolition operations on any pavement, house, commercial building, or other structure, or from landscaping. Such materials include, but are not limited to, dirt, sand, rock, gravel, bricks, plaster, gypsum wallboard, aluminum, glass, asphalt material, plastic pipe, roofing material, carpeting, concrete, wood, masonry, rocks, trees, remnants of new materials, including paper, plastic, carpet scraps, wood scraps, scrap metal, building materials, packaging and rubble resulting from construction, remodeling, renovation, repair and demolition operations on pavements, houses, commercial buildings and other structures

J. **Construction and Demolition Diversion Fee** or **Diversion Fee** means any money order, cash, or certified check submitted to the County pursuant to this Ordinance.

K. **Conversion Rate** means the rate set forth in the tables provided in the County's Construction and Demolition Materials Management Plan pursuant to this Ordinance for use in estimating the volume or weight of

materials identified pursuant to the requirements of the County's Construction and Demolition Materials Management Plan.

L. **County** shall mean Lee County, Florida.

M. **Covered Project** means a project for which a building, demolition, or other similar permit is required by County Ordinance.

N. **Customer** means a Business or a Multi-Family Property that has arranged for recycling collection services to be provided by a service provider with or without compensation. Where several businesses share garbage containers and collection service, "Customer" refers only to the entity that arranges the collection service for all.

O. **Deconstruction** means a process to dismantle or remove useable materials from structures, in a manner which maximizes the recovery of building materials for reuse and recycling and minimizes the amount of waste transported for disposal in landfills and transformation facilities

P. **Demolition** means the destruction, razing, ruining, tearing down or wrecking of any facility, structure, pavement, or building, whether in whole or in part, whether interior or exterior

Q. **Director** means the Director of the Solid Waste Division or his/her designated representative.

R. **Diversion Requirement** means the diversion of at least fifty percent (50%) of the total Construction and Demolition Debris generated by a Covered Project by reuse or recycling, unless the Permittee has been granted an exemption pursuant to this Chapter. If the Permittee has been

granted an exemption, the Diversion Requirement shall be the maximum feasible diversion rate established by the Director for the Project.

S. **Divert** or **Diversion** means activities which reduce or eliminate the amount of C&D Material from disposal in a landfill.

T. **Exempt Project** shall have the meaning set forth in Section 5.G. of this Ordinance.

U. **Franchise Contractor** means those firms specifically authorized by a solid waste franchise collection contract with Lee County to provide solid waste collection services within Lee County.

V. **Governmental Property** for the purposes of this Ordinance, means property owned by the United States of America or the State of Florida or any of their agencies, a special district, and an independent statutory district.

W. **Material Recovery Facility (MRF)** is any business, organization or facility that receives recyclable materials from residential or business sources and processes those materials by sorting, baling, crushing and/or granulating, for the purpose of marketing such materials.

X. **Multi-Family Property** means any multi-family dwelling building or group of buildings that contain(s) five (5) dwelling units or more on a single parcel including apartments, condominiums, mobile home parks, recreational vehicle parks, etc.

Y. **Owner** shall mean any persons, corporation, partnership or entity, or its agent (such as a condominium or homeowners association), jointly or

severally, having an ownership interest in a multi-family property or business and otherwise responsible for solid waste collection.

Z. **Permittee** means any person, firm, limited liability company, association, partnership, political subdivision, government agency, municipality, industry, public or private corporation, or any other entity whatsoever required to apply for an applicable permit to undertake any Construction, Demolition, or Renovation project within the County. A Permittee must comply with the requirements of this Ordinance.

AA. **Project** means any activity for which a permit for a building, demolition, parking area construction or other permit is required. See also "Covered Project".

BB. **Recyclable Material(s)** means a material which otherwise would be abandoned or discarded but which can be utilized in a secondary material market. Such materials include, but are not limited to, corrugated cardboard, newspaper, wood, junk mail, paper (all colors), aluminum, steel and tin cans, glass bottles and jars, and #1 - #7 plastic containers.

CC. **Recycling** means a series of activities, including collection, separation, and processing, by which products or materials are recovered from or otherwise diverted from the solid waste stream.

DD. **Recycling Program** means a recyclable material separation plan and collection system which a business or multi-family property makes a commitment to comply with the County's recycling requirement, specifying which materials it will recycle and designating a service provider.

EE. **Renovation** means any change, addition, or modification to an existing structure that requires a building permit or demolition permit but does not include a project limited to interior plumbing work, electrical work or mechanical work.

FF. **Reuse** means further or repeated use of materials.

GG. **Salvage** means the controlled removal of Construction or Demolition Debris from a building or Demolition project for the purposes of Recycling, Reuse, or storage for later Recycling or Reuse.

HH. **Self-Haul** when used in reference to recyclable materials generated by a business subject to this Ordinance, means the collection and transportation of such material where an owner or employee of the entity hauls the recyclable material to a MRF rather than hiring a service provider to perform this function.

II. **Service Provider** means a person, firm or corporation engaged in the removal of Recyclable Material from any location within Lee County and includes Franchise Contractors.

JJ. **Solid Waste** means the definition as stated at Section 403.703, Florida Statutes, and Fla. Admin. Code R. 62-701.200 as either may be amended from time to time. Solid waste generally means any garbage, rubbish, industrial waste, horticultural waste, extraordinary waste or other semi-solid material resulting from domestic, commercial, industrial, agricultural, or governmental operations including refuse and bulky waste, but excluding hazardous waste, sludge, septic tank pump age, asphalt, tar, oil

and grease, and also excluding any hazardous substances set forth in 40 CFR Part 261.

KK. **Source Separation** shall mean a process that separates the Recyclable Material from solid waste into homogeneous, marketable, and separate Recyclable Materials prior to collection for the purpose of Recycling.

SECTION 3: BUSINESS RECYCLING REQUIREMENTS

A. Program Requirements

All Businesses within unincorporated areas of Lee County shall establish an on-site recycling program and recycle a minimum of one (1) Recyclable Material that the business generates. This primary Recyclable Material shall be the Recyclable Material that makes up the largest portion of the Business' waste stream. The business can sell or exchange at fair market value its own Recyclable Materials for Recycling.

1. Each Business shall enter into a written service agreement, with a Service Provider. The service agreement must provide at a minimum one (1) collection every two (2) weeks of Recyclable Materials. The on-site Business recycling program shall be initiated within three (3) months of the effective date of this Ordinance.
2. A Service Provider or Business shall be responsible for the collection, intermediate storage or transfer, transportation, and/or sale of Recyclable Materials to a processor, broker, or market engaged in the reuse of materials.

3. All Service Providers who collect recyclable material from businesses in unincorporated Lee County must comply with applicable federal, state, and county laws, and regulations.

4. All Businesses must maintain a Recycling Program form on-site for review by the County effective January 1, 2008 or within fourteen (14) days of beginning operations after the effective date of this Ordinance. Where a Business covers multiple service locations, the Business shall maintain a Recycling Program form for each location. Recycling programs shall be maintained in effect regardless of any change of building ownership or service provider.

5. Recycling collection schedules and pickup locations shall be mutually agreed upon by the business and the Service Provider and shall be indicated in a written service agreement. The County is not responsible for any problems, unauthorized collections, liabilities, or any other difficulties that arise between the Service Provider and the Business except when the service provider is the County's Franchise Contractor performing in their service area.

6. Each Business shall recycle a minimum of one (1) material listed below or other non-listed materials that are approved by the Director. Materials should be prepared and/or separated in a manner mutually acceptable to the Service Provider and the Business. This paragraph does not limit the recycling of additional materials as desired by the business, nor does it prohibit a

business from Self-Hauling material to a Material Recovery Facility, processor, or material broker.

- Fiber Products – which include, at a minimum, mixed office paper (white and colored), newspaper, corrugated cardboard, and paperboard
- Co-mingled containers – which include at a minimum, aluminum cans, tin/steel cans, glass bottles and jars, and #1-#7 plastic containers
- Ferrous metal
- Non-ferrous metal
- Wood

7. The County reserves the authority to add or delete materials to the above list. Substitutions for items on the list will be considered by the Solid Waste Division Director on a case by case basis subject.

8 Containers

a. Containers provided by the Service Provider or Business for Recyclable Materials, including compactors, shall be clearly and sufficiently labeled in English (and in other languages if appropriate) and shall indicate the Recyclable Material to be placed in the container, the word "recycling" or "recyclable" or the "chasing arrows" recycling symbol shall be indicated and indicate "No Trash" or other suitable language restricting the use of the container to Recyclables only..

b. Containers used to collect Recyclable Material shall have adequate capacity and durability to function efficiently and meet the spatial constraints of the business. The type of containers used for collection of Recyclable Materials will be established between the Business and the Service Provider.

c. Any recycling containers required for a Recycling program will be provided by the Service Provider or Business.

d. Containers located outdoors shall be covered and otherwise secured to prevent container and material from blowing, leaking or falling out and to protect the materials from vector populations and the elements.

9. Indoor collection/storage areas shall be established in accordance with appropriate fire, building and/or safety codes.

10. Exterior Recyclable Materials storage areas shall be established in accordance with County requirements for solid waste enclosures.

11. The Business property owner shall maintain all Recyclable Material storage areas, including the containers, in a clean, sanitary and litter-free manner.

B. Promotion and Education

1. A Business subject to this ordinance is responsible for notifying and continually educating its employees on recycling practices at the Business through a formal and ongoing education program. Each Business shall distribute to new employees and to all existing

employees at least annually, general recycling information and current program recycling guidelines.

2. The Business shall provide recycling service options that enhance convenience for employees/tenants in order to gain and maintain maximum participation in the program, thus reducing the volume of solid waste generated.

3. The County will provide general promotional material such as posters and introductory letters. If requested the County will also assist with information for site-specific Recycling programs.

C. Recordkeeping

1. All businesses shall maintain records and reports as required herein and promptly respond to periodic requests from the Solid Waste Division for such records and reports that are directly pertinent to its Recycling Program.

2. The County reserves the right to obtain copies of the service agreement and/or scale receipts, and enter the premises to inspect the recycling program. Information requested by the County shall be provided or made available to the County within twenty (20) working days of a written request for any relevant, non-financial information from the Business as may be needed to satisfy the requirements of this Ordinance. If the County inspects a business pursuant to this Ordinance, Recycling Program information shall be made available during the inspection. Upon inspection of the

business premises, the County may inspect all relevant information related to the Recycling Program as necessary to verify sale or delivery of collected Recyclable Materials. If records are not kept on-site, the business owner will make them available within twenty (20) business days of the County's written request.

D. Temporary Exemptions for Recyclable Materials

1. Commercial businesses on minimum refuse service as defined by the Solid Waste Division are exempt from the requirements of this ordinance.

2. Limited exemptions, as set forth below, may be approved by the Director or his/her designee. Applications for an exemption from the requirements of this Ordinance shall be submitted in writing to the Director. An exemption may be allowed where compliance with the Ordinance would result in unnecessary hardship to the Business and the need for an exemption would not be shared generally by other Businesses. All exemptions are to be construed as temporary, for a period not to exceed one (1) year, and shall be considered withdrawn on the first to occur of (a) a change in the condition(s) which prompted the exemption, or (b) the expiration of the time period granted in the exemption. Should an exemption be withdrawn because the time period has expired, an applicant may apply for renewal of the exemption. Applications are evaluated against the following criteria:

a. Incompatibility of compliance with the requirements of this Ordinance and compliance with other Lee County ordinances or other laws;

b. Unavailability of collectors or acceptors (defined as licensed haulers of Recyclable Materials or intermediate or final processors of Recyclable Materials);

c. Unavailability of on-site space for the separate and temporary storage of one (1) or more of the required recyclable materials;

d. Extreme disparity between the applicant's costs of recycling one (1) or more of the required materials and the costs of disposal of the same material(s);

e. Negligible generation rates of one (1) or more of the required recyclable materials.

f. Other conditions, in the opinion of the Director, that are considered as adequate justification for adaptation consideration.

g. The Director will consider these criteria in evaluating the application and will consider the compliance rate, implementation plans, and recycling programs of similar businesses in Lee County. The Director will direct solid waste division staff to make a site visit and prepare a report on the applicant's property.

2. After reviewing the information described in subsection (1) above, the Director may take one (1) of the following actions:

a. Grant an adaptation that requires the applicant to recycle alternative materials identified by the Director;

b. Grant an adaptation that reduces the number of types of materials required to be recycled; or

c. Deny the request for an adaptation.

E. Compliance and Enforcement for Business Recycling Programs

1. An Advance Disposal Fee (ADF) will be assessed monthly on each commercial location refuse billing statement for non-compliance with this Ordinance. These fees are outlined below. Commencement of billing will occur after the effective date of this Ordinance. The solid waste generation rate category is the category that corresponds to the type of business (Florida DOR Classification) as set forth in Ordinance 96-09 and the applicable waste generation range for such businesses per unit. Upon presentation of the information and materials required, the ADF may be waived for a Business for a period of one year. Continued waiver of this fee is contingent on submittal of an exemption and approval by the Solid Waste Division of an updated Recycling Program and appropriate agreements and provisions.

Solid Waste Generation Rate Category	ADF Fee
A, B	$100
C	$250
D, E	$500

2. In evaluating whether a violation of this Ordinance has occurred, County staff have the right to visit the Business and determine the presence and capacity of recycling containers, the presence and quantities of Recyclable Materials in recycling containers, the presence of signs, flyers, stickers and other information which promotes recycling, and engage in discussion with employees, tenants and owners, and Service Providers regarding the Business' Recycling Program. Any separation and storage of Recyclable Materials shall be undertaken in a location suitable and adequate for such activity. Separation and storage facilities shall comply with all applicable laws.

3. The owner, unless he or she has otherwise arranged for and received approval from the Solid Waste Division Director for more time, will be given twenty (20) business days from the date of the notification to provide the County with a written explanation of the pertinent events and circumstances relative to the alleged violation.

4. Lee County Solid Waste Division staff will be available for assistance in setting up a satisfactory Recycling System and achieving compliance with this Ordinance.

5. Should the owner, after the provided twenty (20) business days, be found to continue to be in violation of this Ordinance, the owner will be assessed the Advance Disposal Fee from the date of the initial violation until such time that the owner can demonstrate, to the satisfaction of the Director that the owner is again in compliance with the Ordinance.

6. Should the owner be found to be in violation of this Ordinance due to a suspension of service due to non-payment of invoices from the service provider, the owner will be assessed $300 for each violation from the date of the initial violation until such time that the owner can demonstrate, to the satisfaction of the Solid Waste Division staff that the owner is again in compliance with the Ordinance.

F. Enforcement Actions for Business Properties

1. The Lee County Solid Waste Division, the Division of Codes and Building Services, and the Lee County Sheriff's Office have the concurrent authority and jurisdiction to enforce the provisions of this Ordinance. In addition to the procedures and penalties set forth below, the County also has recourse to any remedies available at law or in equity, including injunctive relief and damages.

2. Civil Action: The County may take civil action to enforce the provisions of this Ordinance in accordance with the following procedures:

   a. Hearing Examiner Process:

      The provisions of this Ordinance are enforceable through the Hearing Examiner process in accordance with the procedures as set forth in Chapter 162, Florida Statutes, the Lee County Land Development Code Ch. 2., Art. VII, and the Lee County Administrative Code Section 2-14, as amended from time to time.

   b. Citation Process:

      The provisions of this Ordinance are enforceable through the citation process in accordance with the requirements as set forth in Chapter 162, Florida Statutes, the Lee County Land Development Code Section 2-430 and Lee County Administrative Code 12-5 (each as amended).

3. Criminal Action: The County may take criminal action when appropriate to enforce the provisions of this Ordinance in accordance and in conjunction with Florida Statutes.

4. Penalties:

   a. Civil: A violation of this Ordinance may subject the property owner to a fine of up to $500.00 per violation. For purposes

of this Ordinance, each day a violation continues to exist constitutes a separate violation.

b. Criminal: A violation of this Ordinance may also constitute a second-degree misdemeanor punishable in accordance with Florida Statutes by:

(1) A $500.00 fine,

(2) Up to ten (10) days imprisonment or community service, or

(3) Both fine and imprisonment or community service.

SECTION 4: MULTI-FAMILY RECYCLING REQUIREMENTS

A. Program Requirements

1. All properties in the County identified as Multi-Family shall institute an on-site recycling program, and provide a collection system for collection of mixed paper, office paper, newspaper, paperboard, and corrugated cardboard, glass containers, #1 through #7 plastic containers, metal and aluminum cans, white goods, and electronic devices. Such recycling shall be done in compliance with this Ordinance and Lee County Ordinance 05-13, as may be revised or amended from time to time.

2. All Multi-Family properties must provide a Recycling Program effective January 1, 2008, or within fourteen (14) days of initial occupancy, after the effective date of this Ordinance. Where a

Multi-Family entity consists of multiple properties the Multi-Family entity shall maintain a Recycling Program for each property.

3. Recycling collection pickup locations shall be mutually agreed upon by the Multi-Family property owner and the Service Provider. The collection schedule shall be at a minimum weekly.

4. Containers:

   a. Containers provided by the Service Provider or Multi-Family property for Recyclable Materials, including compactors, shall be clearly and sufficiently labeled in English (and in other languages if appropriate), shall indicate the Material to be placed in the container and the word "recycling" or "recyclable" or the "chasing arrows" recycling symbol shall be indicated and indicate "No Trash" or other suitable language restricting the use of the container to Recyclables only.

   b. Containers used to collect Recyclable Material shall have adequate capacity and durability to function efficiently and meet the spatial constraints of the business. The type of containers used for collection of Recyclable Materials will be established between the Business and the Service Provider.

   c. Any recycling containers required for a Recycling program will be provided by the Service Provider or Multi-Family property.

d. Containers located outside the Multi-Family properties shall be covered and otherwise secured to prevent container and material from blowing, leaking or falling out and to protect the materials from vector populations and the elements.

e. Indoor collection/storage areas shall be established in accordance with appropriate fire, building and/or safety codes.

f. Exterior Recyclable Materials storage areas shall be established in accordance with County requirements for solid waste enclosures.

g. The Multi-Family property shall maintain all Recyclable Material storage areas, including the containers, in a clean, sanitary and litter-free manner.

B. Promotion and Education

1. A Multi-Family property is responsible for notifying and continually educating its tenants on recycling practices at the Multi-Family property through a formal and ongoing education program. Each Multi-Family property shall distribute to new tenants and to all existing tenants at least annually, general recycling program information and current program recycling guidelines applicable to the Multi-Family property.

2. The County will provide general promotional material such as posters and introductory letters. If requested the County will also assist with information for site-specific recycling programs.

C. Temporary Exemptions for Materials

1. Limited exemptions, as set forth below, may be approved by the Director. Applications for an exemption from the requirements of this Ordinance shall be submitted to the Director. An exemption may be allowed where compliance with the Ordinance would result in unnecessary hardship to the Multi-Family property and the need for an exemption would not be shared generally by other Multi-Family properties. All exemptions are to be construed as temporary, for a period not to exceed one (1) year, and shall be considered withdrawn on the first to occur of (a) a change in the condition(s) which prompted the exemption, or (b) the expiration of the time period granted in the exemption. Should an exemption be withdrawn because the time period has expired, an applicant may apply for renewal of the exemption. Application forms are available from the County's Solid Waste Division. Applications are evaluated against the following criteria:

   a. Incompatibility of compliance with the requirements of this Ordinance and compliance with other Lee County ordinances or other laws;

b. Unavailability of on-site space for the separate and temporary storage of one (1) or more of the required recyclable materials; or

2. The Director will consider the above-mentioned criteria in evaluating the application and will consider the compliance rate, implementation plans, and recycling programs of similar multi-family businesses in Lee County. The Director will direct Solid Waste Division staff to make a site visit and prepare a report on the Multi-Family property.

3. After reviewing the information described in subsection (1) above, the Director may take one (1) of the following actions:

a. Grant an adaptation that requires the applicant to recycle alternative materials identified by the Director;

b. Grant an adaptation that reduces the number of types of materials required to be recycled; or

c. Deny the request for an adaptation.

D. Recordkeeping

1. All Multi-Family properties shall maintain records and reports as required herein and promptly respond to periodic requests for such records and reports that are directly pertinent to the recycling guidelines.

2. The County reserves the right to obtain copies of the service agreement and/or scale receipts, and enter the premises to inspect

the recycling program. Information requested by the County shall be provided or made available to the County within twenty (20) business days of a written request for any relevant, non-financial information from the Multi-Family property as may be needed to satisfy the requirements of the Ordinance. If the County inspects a Multi-Family property as provided in the Ordinance, Recycling program records shall be made available during the inspection. Upon inspection of the Multi-Family property, the County may request other relevant information related to the Recycling Program, including receipts or invoices necessary to verify sale or delivery of collected Recyclable Materials. If records are not kept on-site, the Multi-Family property will make them available within twenty (20) business days of the written request.

E. Compliance & Enforcement

1. In evaluating whether a violation of County Ordinance has occurred, County staff have the right to visit the premises and determine the presence and capacity of recycling containers, the presence and quantities of Recyclable Materials in recycling containers, the presence of signs, flyers, stickers and other information which promotes recycling, and engage in discussion with employees, tenants and owners, and Contractor regarding their recycling program. Any processing and storage of Recyclable Materials shall be undertaken in a location suitable and adequate

for such activity. Processing and storage facilities shall comply with all applicable zoning ordinances and any other applicable local and state statutes, ordinances and regulations.

2. The County may initiate an enforcement action based on its own observations or a complaint from others for violation of County Ordinance. The County will deliver notice of the violation to the property owner describing the nature of the violation and providing a point of contact with County staff to remedy the problem.

3. The owner, unless he has otherwise arranged for and received approval from the Solid Waste Services Director for more time, will be given twenty (20) business days from the date of the notification to provide the County with a written explanation of the pertinent events and circumstances relative to the alleged violation.

4. Solid Waste Division staff will be available for assistance in setting up a satisfactory recycling system and achieving compliance with this ordinance.

5. Should the owner, after the provided twenty (20) business days, be found to continue to be in violation of this Ordinance, the owner will be assessed $300 for each violation from the date of the initial violation until such time that the owner can demonstrate, to the satisfaction of the Solid Waste Division staff that the owner is again in compliance with the Ordinance.

F. Enforcement Actions for Multi-Family Properties

1. The Lee County Solid Waste Division, the Division of Codes and Building Services, and the Lee County Sheriff's Office have the concurrent authority and jurisdiction to enforce the provisions of this Ordinance. In addition to the procedures and penalties set forth below, the County also has recourse to any remedies available at law or in equity, including injunctive relief and damages.

2. Civil Action: The County may take civil action to enforce the provisions of this Ordinance in accordance with the following procedures:

   a. Hearing Examiner Process:

      The provisions of this Ordinance are enforceable through the Hearing Examiner process in accordance with the procedures as set forth in Chapter 162, Florida Statutes, the Lee County Land Development Code Ch. 2., Art. VII, and the Lee County Administrative Code Section 2-14, as amended from time to time.

   b. Citation Process:

      The provisions of this Ordinance are enforceable through the citation process in accordance with the requirements as set forth in Chapter 162, Florida Statutes, the Lee County Land Development Code Section 2-430 and Lee County Administrative Code 12-5 (each as amended).

3. Criminal Action: The County may take criminal action when appropriate to enforce the provisions of this Ordinance in accordance and in conjunction with Florida Statutes.

4. Penalties:

a. Civil: A violation of this Ordinance may subject the property owner to a fine of up to $500.00 per violation. For purposes of this Ordinance, each day a violation continues to exist constitutes a separate violation.

b. Criminal: A violation of this Ordinance may also constitute a second-degree misdemeanor punishable in accordance with Florida Statutes by:

(1) A $500.00 fine,

(2) Up to ten (10) days imprisonment or community service, or

(3) Both fine and imprisonment or community service.

SECTION 5: CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING REQUIREMENTS

A. Covered Projects

1. Effective June 1, 2008 and except as otherwise provided in this Ordinance, each Permittee's Covered Project for which a permit application was submitted after January 1, 2008 shall be required to comply with the provisions of the County's Construction and

Demolition Materials Management Plan ("C&DMMP"), as described in this Ordinance, unless the project is exempted, as described below.

2. No Diversion Fee shall be required for any of the following:

   a. Work for which a building permit is not required by this Ordinance;

   b. Any new residential construction project less than $90,000 dollars;

   c. Any new commercial construction project less than $90,000;

   d. Residential alterations less than $10,000;

   e. Commercial alterations less than $10,000;

   f. Projects for which only a plumbing permit, electrical permit or mechanical permit is required;

   g. Roofing projects that do not include removal of the existing roof;

   h. Demolition or Construction required to protect public health or safety in an emergency, as may be amended from time to time.

B. Construction and Demolition Materials Management Plans

1. The County will prepare a standard Construction and Demolition Materials Management Plan ("C&DMMP") for the use of Permittees during the course of the permit period. The C&DMMP will require that the Permittee perform all of the following: (1) estimate the

volume or weight of Project C&D Materials, by materials type, to be generated; (2) estimate the maximum volume or weight of C&D Materials that it is feasible to divert, considering cost, energy consumption and delays, via reuse or recycling; (3) designate the vendors or facilities that the Permittee proposes to use to collect, divert, market, reuse and/or receive the C&D Materials; and (4) estimate the volume or weight of residual C&D Materials that would be transported for disposal.

2. In estimating the volume or weight of materials identified in the C&DMMP, the Applicant shall use the standardized Conversion Rates approved by the County for this purpose.

3. Permittees for building or demolition permits involving the removal of all or part of an existing structure shall consider Deconstruction, to the maximum extent feasible, and shall consider making the materials generated therefore available for Salvage prior to being transported for disposal in a landfill or transformation facility.

C. Diversion of waste

1. For the purposes of this Ordinance, diversion may be accomplished using any of the following methods:

   a. Use of new construction methods, as approved by the Director, that reduce the amount of waste generated.

   b. On-site reuse of the waste.

c. Delivery of the waste from the site to a County Approved Recycling Facility as described in this Ordinance.

d. Other methods approved by the Director.

2. All of the waste diversion methods which may qualify for a waiver of the Diversion Fee are subject to restrictions and documentation requirements as set forth by the Director.

D. Approved Recycling Facilities

1. The Director shall issue approval only if the owner or operator of the facility submits documentation satisfactory to the Director:

a. That the facility has obtained all applicable Federal, State, and local permits and is in full compliance with all applicable regulations; and

b. The percentage of incoming waste from construction, demolition, and alteration activities that is diverted from landfill disposal meets the required minimum percentage set forth in this Ordinance.

c. The Director will indicate whether a facility approval allows for commingled or source separated materials and which materials are included with the approval.

2. The County shall make available a current list of Approved Recycling Facilities that may change from time to time.

E. Construction and Demolition Materials Management Plan Diversion Fee

1. Each Permittee for a Covered Project shall be subject to a Diversion Fee per the conditions of Section F below. The amount of the Diversion Fee shall be calculated as indicated below:

   a. Roofing - $100

   b. Residential home - $300

   c. Commercial less than 10,000 square feet (sf) - $500

   d. Commercial between 10,000 sf and 100,000 sf - $1,000

   e. Commercial greater than 100,000 sf - $5,000

   f. Residential alterations - $100

   g. Commercial alterations - $300

   h. Demolition value less than or equal to $10,000 - $300

   i. Demolition value greater than $10,000 - $750

F. Assessment of Diversion Fee

1. Prior to issuance of a Certificate of Occupancy or a Certificate of Compliance for any Covered Project, as applicable, the Permittee may submit to the Director documentation that the Permittee has satisfied the Diversion Requirement for the project. This documentation shall include all of the following:

   a. Receipts and gate tickets from the vendor(s) or facility(s) that collected or received C&D Debris from the Covered Project showing the actual weight or volume of that material;

b. Any additional information the Permittee believes is relevant in determining its efforts to comply with this Ordinance.

c. A complete C&DMMP applicable to the covered project.

d. A certified statement using the County approved form attesting to the validity and accuracy of the supporting information and that the Covered Project was performed in compliance with the requirements of this Ordinance.

If the Permittee fails to submit the required documentation and certification, the Permittee shall submit a Diversion Fee as defined along with all other applicable fees at the time of issuance of the Certificate of Occupancy or Certificate of Compliance.

2. Applicants shall make reasonable efforts to ensure that all C&D Materials diverted, or delivered to disposal facilities for disposal, are measured and recorded using the most accurate method of measurement reasonably available. To the extent practical, all C&D debris shall be weighed on scales. Such scales shall be in compliance with all regulatory requirements for accuracy and maintenance. For C&D debris for which weighing is not practical due to size or other considerations, a volumetric measurement may be used. For conversion of volumetric measurements to weight, the Applicant shall use the standardized conversion rates approved by the Director for this purpose. Documentation of the foregoing shall

consist of photocopies of receipts, weight tickets, gate tickets, and other records from recycling facilities, deconstruction contractors, solid waste enterprises and disposal facilities.

3. The Director shall review the information submitted and determine whether the Permittee has complied with the requirements of this Ordinance for material diversion, as follows:

   a. If the Director determines that the documentation and certification provided by the Permittee does not fully comply with the requirements of this Ordinance, the Permittee will be found to be in violation of this Ordinance and issued a citation or the County may take other actions as set forth in Section 5.H. of this Ordinance.

   b. The Director may authorize the refund of any Diversion Fee which was erroneously paid or collected.

   c. The Director may authorize the refund of a Diversion Fee if the building or demolition permit application is withdrawn or cancelled before any work has begun.

6. Should the owner be found to be in violation of this Ordinance, the Permittee will be assessed three times (3X) the Diversion Fee as defined for the Covered Project.

G. Exemptions from Diversion Requirements

1. If a Permittee for a Covered Project experiences or anticipates unique circumstances that the Permittee believes make it not

feasible to comply with the Diversion Requirement, the Permittee may apply in writing for an exemption with the Solid Waste Division prior to submission of the required documentation and certification. The Permittee shall indicate to the Solid Waste Division the maximum rate of diversion the Permittee believes is feasible for each material and the specific circumstances that the Permittee believes make it not feasible to comply with the diversion requirement.

2. The Director shall review the information supplied by the Permittee and may meet with the Permittee to discuss possible ways of meeting the diversion requirement. Based on the information supplied by the Permittee, the Director shall determine whether it is possible for the Permittee to meet the diversion requirement.

3. If the Director determines that it is not feasible for the Permittee to meet the diversion requirement, the Director shall determine the maximum feasible diversion rate for each material. This determination will be used for comparison purposes upon request for Certificate of Occupancy or for refund of the Diversion Fee, as applicable.

4. If the Director determines that it is possible for the Permittee to meet the Diversion Requirement, the Director shall so inform and give reason(s) to the Permittee.

H. Enforcement Actions for Covered Projects

1. The Lee County Solid Waste Division, the Division of Codes and Building Services, and the Lee County Sheriff's Office have the concurrent authority and jurisdiction to enforce the provisions of this Ordinance. In addition to the procedures and penalties set forth below, the County also has recourse to any remedies available at law or in equity, including injunctive relief and damages.

2. Civil Action: The County may take civil action to enforce the provisions of this Ordinance in accordance with the following procedures:

   a. Hearing Examiner Process:

      The provisions of this Ordinance are enforceable through the Hearing Examiner process in accordance with the procedures as set forth in Chapter 162, Florida Statutes, the Lee County Land Development Code Ch. 2., Art. VII, and the Lee County Administrative Code Section 2-14, as amended from time to time.

   b. Citation Process:

      The provisions of this Ordinance are enforceable through the citation process in accordance with the requirements as set forth in Chapter 162, Florida Statutes, the Lee County Land Development Code Section 2-430 and Lee County Administrative Code 12-5 (each as amended).

3. Criminal Action: The County may take criminal action when appropriate to enforce the provisions of this Ordinance in accordance and in conjunction with Florida Statutes.

4. Penalties:

   a. Civil: A violation of this Ordinance may subject the Permittee to a fine of up to $15,000 per violation. For purposes of this Ordinance, each day a violation continues to exist constitutes a separate violation.

   b. Criminal: A violation of this Ordinance may also constitute a second-degree misdemeanor punishable in accordance with Florida Statutes by:

      (1) A $500.00 fine,

      (2) Up to ten (10) days imprisonment or community service, or

      (3) Both fine and imprisonment or community service.

SECTION 6: PROCEDURE FOR ADOPTING CHANGES TO FEES AND PENALTIES

Any future changes or adjustments to Advance Disposal Fees, Diversion Fees, penalties or other fees or charges related to this Ordinance will be made by County Resolution adopted by a majority of the Board of County Commissioners at a regular meeting.

SECTION 7: CONFLICTS OF LAWS

Whenever the requirements or provisions of this Ordinance are in conflict with the requirements or provisions of any other lawfully adopted Lee County Ordinance or Florida Statute, the more restrictive shall apply.

SECTION 8: SEVERABILITY

The provisions of this Ordinance are severable and it is the intention to confer upon the whole or any part of the powers herein provided for. If any of the provisions of this Ordinance shall be held unconstitutional by any Court or competent jurisdiction, the decision of such Court shall not affect or impair any remaining provisions of this Ordinance. It is hereby declared to be the legislative intent that this Ordinance would have been adopted had such unconstitutional provision not been included therein.

SECTION 9: CODIFICATION, INCLUSION IN CODE AND SCRIVENER'S ERRORS

It is the intention of the Board of County Commissioners that the provisions of this Ordinance shall become and be made a part of the Lee County Code, and that sections of this Ordinance may be renumbered or relettered and that the word "Ordinance" may be changed to "section", "article", or such other appropriate word or phrase in order to accomplish such intention, and regardless of whether such inclusion in the Code is accomplished, sections of this Ordinance may be renumbered or relettered and typographical errors which do not affect the intent may be authorized by the County Manager or the County Manager's designee, without need of public hearing, by filing a corrected or recodified copy of same with the Clerk of Circuit Court.

SECTION 10: EFFECTIVE DATE

This Ordinance, if adopted by the Board, shall take effect January 1, 2008 upon its filing with the Office of the Secretary of the Florida Department of State.

[Remainder of Page Left Blank Intentionally]

Commissioner Hall made a motion to adopt the foregoing Ordinance, seconded by Commissioner Mann. The vote was as follows:

BOB JANES	Aye
BRIAN BIGELOW	Aye
RAY JUDAH	Aye
TAMMY HALL	Aye
FRANK MANN	Aye

DULY PASSED AND ADOPTED THIS 11th day of September 2007.

ATTEST: CHARLIE GREEN
CLERK OF COURTS

BY: _____
Deputy Clerk

BOARD OF COUNTY COMMISSIONERS
OF LEE COUNTY, FLORIDA

BY: _____
Chair

BOARD OF COUNTY COMMISSIONERS SEAL LEE COUNTY, FLORIDA

APPROVED AS TO FORM:

BY: _____
Scott S. Coovert
Assistant County Attorney
Office of the County Attorney

S:\GS\ORDINANCE\07-25 Business Recycling Ordinance - SSC.doc

FLORIDA DEPARTMENT of STATE

CHARLIE CRIST
Governor

STATE LIBRARY AND ARCHIVES OF FLORIDA

KURT S. BROWNING
Secretary of State

September 17, 2007

Honorable Charlie Green
Clerk of Court
Lee County
Post Office Box 2469
Fort Myers, Florida 33902-2469

Attention: Patricia Weseman, Deputy Clerk

Dear Mr. Green:

Pursuant to the provisions of Section 125.66, Florida Statutes, this will acknowledge receipt of your letters dated September 13, 2007 and certified copies of Lee County Ordinance Nos. 07-25 and 07-26, which were filed in this office on September 14, 2007.

Sincerely,

Liz Cloud

Liz Cloud
Program Administrator

LC/lbh

RECEIVED
MINUTES OFFICE
2007 SEP 20 AM 10:53

DIRECTOR'S OFFICE
R.A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399-0250
850.245.6600 • FAX: 850.245.6735 • TDD: 850.922.4085 • http://dlis.dos.state.fl.us

COMMUNITY DEVELOPMENT
850.245.6600 • FAX: 850.245.6643

STATE LIBRARY OF FLORIDA
850.245.6600 • FAX: 850.245.6744

STATE ARCHIVES OF FLORIDA
850.245.6700 • FAX: 850.488.4894

LEGISLATIVE LIBRARY SERVICE
850.488.2812 • FAX: 850.488.9879

RECORDS MANAGEMENT SERVICES
850.245.6750 • FAX: 850.245.6795

ADMINISTRATIVE CODE AND WEEKLY
850.245.6270 • FAX: 850.245.6282

Appendix B

Total Tons of MSW Materials Collected and Recycled in Florida in 2023

2023 Total Tons of MSW Materials Collected and Recycled in Florida
By Descending Population

County	C&D Debris Total	C&D Debris Recycled	%	White Goods Total	White Goods Recycled	%	Tires Total	Tires Recycled	%
Miami-Dade	1,153,260	461,970	40%	38,369	34,257	89%	262,993	139,836	53%
Broward	2,007,599	779,229	39%	48,966	38,820	79%	24,483	721	3%
Hillsborough	972,824	707,472	73%	54,349	31,430	58%	4,941	523	11%
Palm Beach	1,556,144	1,258,938	81%	34,293	25,623	75%	34,703	22,487	65%
Orange	1,720,128	797,061	46%	31,498	18,324	58%	26,512	10,500	40%
Duval	1,739,117	1,135,043	65%	88,673	32,428	37%	23,327	2,096	9%
Pinellas	681,523	543,432	80%	12,068	265	2%	12,000	496	4%
Lee	934,495	911,069	97%	33,166	260	1%	2,315	751	32%
Polk	215,406	45,693	21%	3,785	0	0%	10,847	1,318	12%
Brevard	398,020	265,660	67%	9,363	7,923	85%	8,186	0	0%
Pasco	657,007	293,219	45%	0	0	0%	2,360	0	0%
Volusia	619,061	295,632	48%	13,913	5,360	39%	6,733	3,468	52%
Seminole	157,066	60,927	39%	7,634	3,817	0%	3,491	2,048	59%
Sarasota	688,869	561,048	81%	9,432	330	3%	5,478	4,178	76%
Manatee	515,176	414,300	80%	3,366	242	7%	9,109	5,337	59%
Osceola	117,680	6,060	5%	2,853	2,539	89%	782	601	77%
Lake	327,936	80,529	25%	1,080	0	0%	1,368	464	34%
Marion	340,711	118,399	35%	806	0	0%	1,678	1,298	77%
Collier	1,386,242	1,083,133	78%	3,749	31	1%	4,261	2,820	66%
St. Lucie	130,511	54,672	42%	3,020	2,521	83%	6,742	5,075	75%
Escambia	74,440	67,228	90%	8,604	0	0%	2,517	317	13%
St. Johns	290,425	61,745	21%	3,323	1,137	34%	1,629	613	38%
Leon	133,412	80,928	61%	4,809	2,942	61%	3,487	563	16%
Alachua	172,592	101,318	59%	3,450	3,174	92%	3,249	2,977	92%
Clay	125,631	22,534	18%	0	0	0%	976	776	80%
Okaloosa	67,613	28	0%	1,398	802	57%	952	411	43%
Hernando	49,854	22	0%	2,823	181	6%	3,485	246	7%
Charlotte	438,360	279,160	64%	3,361	340	10%	2,880	1,884	65%
Santa Rosa	170,541	54,772	32%	763	0	0%	658	232	35%
Bay	287,896	25	0%	5,933	4,765	80%	959	719	75%
Indian River	34,572	14,677	42%	4,111	1,084	26%	1,811	1,133	63%
Martin	188,978	74,235	39%	3,278	2,757	84%	812	572	70%
Citrus	87,415	74,325	85%	6,847	0	0%	1,312	536	41%
Sumter	151,197	45,158	30%	524	0	0%	1,928	865	45%
Flagler	84,709	72,478	86%	5,929	0	0%	235	79	34%
Highlands	33,935	17,316	51%	519	0	0%	2,135	120	6%
Nassau	107,557	27,615	26%	340	0	0%	183	121	66%
Monroe	153,747	103,756	67%	2,797	0	0%	2,119	117	6%
Walton	27,303	0	0%	0	0	0%	96	86	90%
Putnam	32,633	727	2%	5,445	2,515	46%	2,009	735	37%
Columbia	20,981	4,674	22%	12,480	6,240	50%	93	59	63%
Jackson	3,580	0	0%	1,002	501	0%	59	55	93%
Suwannee	16,921	196	1%	4,793	4,456	93%	130	65	50%
Levy	3,534	17	0%	0	0	0%	132	66	50%
Gadsden	1,758	0	0%	0	0	0%	15	0	0%
Hendry	4,155	0	0%	0	0	0%	362	200	55%
Okeechobee	31,993	0	0%	968	484	0%	230	115	50%
Wakulla	2,922	105	4%	291	0	0%	73	50	68%
Desoto	5,570	0	0%	0	0	0%	539	322	60%
Baker	1,855	14	1%	1,270	636	50%	227	160	70%
Hardee	7,741	0	0%	0	0	0%	449	303	67%
Washington	8,987	0	0%	0	0	0%	119	85	71%
Bradford	1,727	39	2%	1,727	864	50%	85	81	95%
Taylor	2,818	0	0%	1,166	583	0%	50	40	80%
Holmes	486	0	0%	0	0	0%	45	0	0%
Gilchrist	710	0	0%	0	0	0%	156	78	50%
Madison	2,849	0	0%	2,211	1,150	52%	282	0	0%
Dixie	3,781	0	0%	0	0	0%	0	0	0%
Gulf	2,350	0	0%	0	0	0%	0	0	0%
Jefferson	1,040	2	0%	461	344	75%	95	76	80%
Calhoun	25,541	105	0%	0	0	0%	0	0	0%
Hamilton	795	0	0%	456	228	0%	0	0	0%
Franklin	1,410	3	0%	510	291	57%	190	98	52%
Glades	4,427	371	8%	0	0	0%	0	0	0%
Union	730	2	0%	58	30	52%	61	1	2%
Lafayette	289	10	3%	0	0	0%	36	4	11%
Liberty	455	0	0%	294	147	0%	0	0	0%
State	19,190,990	10,977,071	57%	492,324	239,821	49%	489,169	218,977	45%

Appendix C

San Jose, California, C&D Recycling Ordinance

CITY OF SAN JOSÉ, CALIFORNIA

Office of the City Clerk
200 East Santa Clara Street
San José, California 95113
Telephone (408) 535-1260
FAX (408) 292-6207

City Clerk

STATE OF CALIFORNIA)
COUNTY OF SANTA CLARA)
CITY OF SAN JOSE)

I, Toni J. Taber, City Clerk & Ex-Officio Clerk of the Council of and for the City of San Jose, in said County of Santa Clara, and State of California, do hereby certify that **"Ordinance No. 30684",** the original copy of which is attached hereto, was passed for publication of title on the **16th day of November 2021,** was published in accordance with the provisions of the Charter of the City of San Jose, and was given final reading and adopted on the **30th day of November 2021,** by the following vote:

AYES: ARENAS, CARRASCO, COHEN, DAVIS,FOLEY, JONES, JIMENEZ, MAHAN, PERALEZ, LICCARDO.

NOES: NONE.

ABSENT: ESPARZA.
.

DISQUALIFIED: NONE.

VACANT: NONE.

Said Ordinance is effective as of the **24th day of December, 2021.**

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of the City of San Jose, this **16TH day of November, 2021.**

(SEAL)_____
TONI J. TABER, CMC
CITY CLERK & EX-OFFICIO
CLERK OF THE CITY COUNCIL

/YJ

ORDINANCE NO. 30684

AN ORDINANCE OF THE CITY OF SAN JOSE AMENDING CHAPTER 9.10 OF TITLE 9 OF THE SAN JOSE MUNICIPAL CODE TO IMPLEMENT THE REQUIREMENTS OF SB 1383, CALIFORNIA'S SHORT-LIVED CLIMATE POLLUTANT REDUCTION STRATEGY REGULATION, AND TO MORE EFFICIENTLY IMPLEMENT RESIDENTIAL, COMMERCIAL, AND ENFORCEMENT OF SOLID WASTE PROGRAMS

WHEREAS, State recycling law, Assembly Bill 939 of 1989, the California Integrated Waste Management Act of 1989 (California Public Resources Code Section 40000, et seq., as amended, supplemented, superseded, and replaced from time to time), requires cities and counties to reduce, reuse, and recycle (including composting) Solid Waste generated in their Jurisdictions to the maximum extent feasible before any incineration or landfill disposal of waste, to conserve water, energy, and other natural resources, and to protect the environment; and

WHEREAS, State recycling law, Assembly Bill 341 of 2011 (approved by the Governor of the State of California on October 5, 2011, which amended Sections 41730, 41731, 41734, 41735, 41736, 41800, 42926, 44004, and 50001 of, and added Sections 40004, 41734.5, and 41780.01 and Chapter 12.8 (commencing with Section 42649) to Part 3 of Division 30 of, and added and repealed Section 41780.02 of, the Public Resources Code, as amended, supplemented, superseded and replaced from time to time), places requirements on businesses and Multi-Family property owners that generate a specified threshold amount of Solid Waste to arrange for recycling services and requires Jurisdictions to implement a Mandatory Commercial Recycling program; and

WHEREAS, State organics recycling law, Assembly Bill 1826 of 2014 (approved by the Governor of the State of California on September 28, 2014, which added Chapter 12.9 (commencing with Section 42649.8) to Part 3 of Division 30 of the Public Resources Code, relating to Solid Waste, as amended, supplemented, superseded, and replaced

from time to time), requires businesses and Multi-Family property owners that generate a specified threshold amount of Solid Waste, Recycling, and Organic Material per week to arrange for recycling services for that waste, requires Jurisdictions to implement a recycling program to divert Organic Material from businesses subject to the law, and requires Jurisdictions to implement a Mandatory Commercial Organics Recycling program; and

WHEREAS, SB 1383, the Short-lived Climate Pollutant Reduction Act of 2016, requires CalRecycle to develop regulations to reduce organics in landfills as a source of methane. The regulations place requirements on multiple entities including Jurisdictions, residential households, Commercial Businesses and business owners, Commercial Edible Food Generators, haulers, Self-Haulers, Food Recovery Organizations, and Food Recovery Services to support achievement of Statewide Organic Material disposal reduction targets; and

WHEREAS, SB 1383, the Short-lived Climate Pollutant Reduction Act of 2016, requires Jurisdictions to adopt and enforce an ordinance or enforceable mechanism to implement relevant provisions of SB 1383 Regulations; and

WHEREAS, pursuant to the provisions and requirements of the California Environmental Quality Act of 1970, together with related State CEQA Guidelines and Title 21 of the San José Municipal Code (collectively, "CEQA"), the Director of Planning, Building and Code Enforcement has determined that the provisions of this Ordinance do not constitute a project, under File No. PP17-008 (General Procedure & Policy Making resulting in no changes to the physical environment); and

WHEREAS, the City Council of the City of San José is the decision-making body for this Ordinance; and

WHEREAS, this Council has reviewed and considered the "not a project" determination under CEQA prior to taking any approval actions on this Ordinance;

NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF SAN JOSE:

SECTION 1. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.021 AB 341

"AB 341" means Assembly Bill 341 of 2011 approved by the Governor of the State of California on October 5, 2011, which amended Sections 41730, 41731, 41734, 41735, 41736, 41800, 42926, 44004, and 50001 of, and added Sections 40004, 41734.5, and 41780.01 and Chapter 12.8 (commencing with Section 42649) to Part 3 of Division 30 of, and added and repealed Section 41780.02 of, the Public Resources Code, as amended, supplemented, superseded and replaced from time to time.

SECTION 2. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.022 AB 1826

"AB 1826" means Assembly Bill 1826 of 2014 approved by the Governor of the State of California on September 28, 2014, which added Chapter 12.9 (commencing with Section 42649.8) to Part 3 of Division 30 of the Public Resources Code, as amended, supplemented, superseded, and replaced from time to time.

SECTION 3. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.023 Authorized Organic Material Collector

A. "Authorized Residential Organic Material Collector" means a person authorized under and by virtue of a contract with the City to provide Organic Material services to Residential Premises in the City.

B. "Authorized Commercial Organic Material Collector" means a person authorized under and by virtue of a franchise granted pursuant to Part 11 of this Chapter or a permit issued pursuant to Part 13 of this Chapter to provide Organic Material collection services at Commercial Premises.

C. "Authorized Organic Material Collector" means either an Authorized Residential Organic Material Collector or an Authorized Commercial Organic Material Collector.

SECTION 4. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.041 CalRecycle

“CalRecycle” means California's Department of Resources Recycling and Recovery.

SECTION 5. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.042 California Code of Regulations

“California Code of Regulations” or “CCR” means the State of California Code of Regulations. CCR references in this ordinance are preceded with a number that refers to the relevant Title of the CCR (e.g., “14 CCR” refers to Title 14 of the CCR).

SECTION 6. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.076 Community Composting

“Community Composting" means any activity that composts green material, agricultural material, food material, and vegetative food material, alone or in combination, and the total amount of feedstock and compost on-site at any one time does not exceed one hundred (100) cubic yards and seven hundred fifty (750) square feet, as specified in 14 CCR Section 17855(a)(4); or, as otherwise defined by 14 CCR Section 18982(a)(8).

SECTION 7. Section 9.10.080 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.080 Composting

"Composting" or “Compost” means any process in which waste organic matter decomposes in a controlled environment and the product derived from such process.

SECTION 8. Section 9.10.085 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.085 Construction and Demolition Debris

"Construction and Demolition Debris" means:

A. Recyclable and non-recyclable waste building materials, packaging, and rubble resulting solely from construction, remodeling, repair and demolition operations on any house, residential property, commercial building, pavement or other structure for which the City requires a building or demolition permit issued under Chapter 24.02 of San José Municipal Code or from a non-permitted municipal project and pursuant to a temporary service agreement of no longer than (1) year; or

B. Rock, concrete, asphalt and dirt.

Construction and Demolition Debris may include materials that have been Source Separated.

SECTION 9. Section 9.10.090 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.090 Construction and Demolition Debris Collector

A. "Construction and Demolition Debris Collector" means any person who engages in the business of collecting, transporting and/or disposing of either of the following:

1. Construction and Demolition Debris.

2. Residential clean-out material resulting from the cleaning out of Residential Premises and collected in roll-off or front-load containers rented for a period of one (1) week or less.

B. "Construction and Demolition Debris Collector" includes persons who engage in the activities described in subsection A. incidentally to the business of demolition, construction or remodeling.

SECTION 10. Section 9.10.100 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.100 Designated Collection Location

"Designated Collection Location" means:

A. Any container designated by posted signs, marked or labeled as a container for a specified material type.

B. Any place where an authorized collector has contracted to collect Solid Waste or material segregated from other waste material, including the curbside of a Residential Premises or the service alley of a Commercial Premises.

C. Any place designated in a contract between the City and an authorized collector from which the authorized collector has contracted to collect uncontainerized material.

SECTION 11. Section 9.10.110 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.110 Director

"Director" means the Director of Environmental Services or the Director's designee.

SECTION 12. Section 9.10.120 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.120 Garbage

A. "Garbage" means putrescible wastes including kitchen and table food wastes; animal or nonputrescible wastes that are mixed in the same container with or are contaminated by putrescible wastes; infectious wastes, such as used tissues and disposable diapers, which are normally produced at Residential Premises; small dead animals not exceeding ten (10) pounds in weight; and any putrefactive or easily decomposable waste material that is likely to attract flies, vermin, birds or rodents.

B. Garbage does not include materials that are separated and set aside for Recycling or Composting and does not include Hazardous Material.

C. The determination as to whether material is Garbage shall be made by the Director based on a consideration of the purposes of this Chapter.

SECTION 13. Section 9.10.130 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.130 Generator

"Generator" means any person that generates Solid Waste, Organic Material, or Recyclable Material.

SECTION 14. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.154 High Diversion Organic Waste Processing Facility

“High Diversion Organic Waste Processing Facility” means a facility that is in compliance with the reporting requirements of 14 CCR Section 18815.5(d) and meets or exceeds an annual average Mixed Waste organic content Recovery rate of fifty percent (50%) between January 1, 2022 and December 31, 2024, and seventy-five percent (75%) after January 1, 2025, as calculated pursuant to 14 CCR Section 18815.5(e) for Organic Material received from the “Mixed Waste Organic Collection Stream” as defined in 14 CCR Section 17402(a)(11.5); or, as otherwise defined in 14 CCR Section 18982(a)(33).

SECTION 15. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.161 Medical Waste

“Medical Waste” means waste regulated pursuant to the State Medical Waste Management Act (Part 14 (commencing with Section 117600) of Division 104 of the State Health and Safety Code).

SECTION 16. Section 9.10.170 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.170 Multi-Family Dwelling

A. "Multi-Family Dwelling" means any permanent Premises of at least two (2) units used for residential purposes where the units do not receive separate or individual Solid Waste collection service. By way of illustration, Multi-Family Dwelling includes apartment buildings, attached Single-Family Dwellings such as townhouses and condominiums, and mobilehome parks, in which the units do not receive separate or individual Solid Waste collection service.

B. Multi-Family Dwelling does not include any Mixed Use Development, hotel, motel, guesthouse, Residential Care Facility serving seven or more persons, extended care facility, sorority or fraternity house, school, dormitory, residential service facility, emergency residential shelter, hospital, convent or monastery.

SECTION 17. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.175 Organic Material

“Organic Material” means materials originating from living organisms and their metabolic waste products, including but not limited to food, green material, landscape and pruning waste, organic textiles and carpets, lumber, wood, Paper Products, Printing and Writing Paper, manure, biosolids, digestate, and sludges or as otherwise defined in 14 CCR Section 18982(a)(46).

SECTION 18. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.191 Processing

“Processing” means the reduction, separation, recovery, conversion, or recycling of Solid Waste, Recyclable Material, or Organic Material.

SECTION 19. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.192 Prohibited Container Contaminants

“Prohibited Container Contaminants” means discarded materials placed in a container that are not identified as acceptable for the container type.

SECTION 20. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.225 Residential Care Facility

"Residential Care Facility" is a facility licensed by the State of California where care, services or treatment is provided to persons living in a community residential setting.

SECTION 21. Section 9.10.250 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.250 Rubbish

"Rubbish" means all waste shavings, sawdust, printed matter, paper, pasteboard, rags, straw, used and discarded mattresses, used and discarded clothing, used and discarded shoes and boots, combustible waste pulp and other products such as are used for packaging or wrapping crockery and glass, ashes, cinders, floor sweepings, glass, mineral or metallic substances, earth, rock, used, demolished or discarded building materials, and other waste material not included in the definitions of "Garbage," "Stable Matter" or "Swill" set forth in this Part.

SECTION 22. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.251 SB 1383

“SB 1383” means Senate Bill 1383 of 2016 approved by the Governor on September 19, 2016, which added Sections 39730.5, 39730.6, 39730.7, and 39730.8 to the Health and Safety Code, and added Chapter 13.1 (commencing with Section 42652) to Part 3 of Division 30 of the Public Resources Code, establishing methane emissions reduction targets in a Statewide effort to reduce emissions of short-lived climate pollutants as amended, supplemented, superseded, and replaced from time to time.

SECTION 23. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.255 Self-Hauler

"Self-Hauler" means a person, who hauls Solid Waste, Organic Material or Recyclable Material he or she has generated to another person. Self-Hauler also includes a person who back-hauls waste, or as otherwise defined in 14 CCR Section 18982(a)(66).

SECTION 24. Section 9.10.280 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.280 Solid Waste

"Solid Waste," also referred to in this Chapter as "Mixed Waste," has the same meaning as defined in State Public Resources Code Section 40191, which defines Solid Waste as all putrescible and nonputrescible solid, semisolid, and liquid wastes, including Garbage, trash, refuse, paper, Rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semi-solid wastes, and other discarded solid and semi-solid wastes, with the exception that Solid Waste does not include any of the following wastes:

A. Hazardous waste, as defined in the State Public Resources Code Section 40141.

B. Radioactive waste regulated pursuant to the State Radiation Control Law (Chapter 8 (commencing with Section 114960) of Part 9 of Division 104 of the State Health and Safety Code).

C. Medical Waste regulated pursuant to the State Medical Waste Management Act (Part 14 (commencing with Section 117600) of Division 104 of the State Health and Safety Code). Untreated Medical Waste shall not be disposed of in a Solid Waste landfill, as defined in State Public Resources Code Section 40195.1. Medical Waste that has been treated and deemed to be Solid Waste shall be regulated pursuant to Division 30 of the State Public Resources Code.

SECTION 25. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.301 Solid Waste Enclosure

"Solid Waste Enclosure" means a walled structure with a solid cover for the storage of Solid Waste with a drainage system connected to the sanitary sewer and wash system that are adequate to accommodate anticipated waste generated at the Premises.

SECTION 26. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.302 Solid Waste Room

"Solid Waste Room" means an enclosed and ventilated space with a drainage system connected to the sanitary sewer and wash system that are adequate to accommodate anticipated waste generated at the Premises.

SECTION 27. Section 9.10.305 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.305 Source Separation/Source Separated

"Source Separation" or "Source Separated" means the segregation by the Generator of Recyclable or Organic Materials from other Solid Waste by placing the Recyclable or Organic Materials in separate Solid Waste containers, by binding the materials separately from other waste materials, or by physically separating the materials from other waste materials.

SECTION 28. Section 9.10.360 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.360 Transformation

"Transformation" means incineration, pyrolysis, distillation, gasification, anaerobic digestion, or biological conversion other than Composting. Transformation does not include Composting.

SECTION 29. Section 9.10.380 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.380 Yard Waste

"Yard Waste" means grass, weeds, leaves, tree trimmings, plants, shrubbery prunings, and such other similar materials which are generated in the maintenance of yards, gardens or commercial landscaping in the City and which are separated from other Solid Waste materials and placed in a Designated Collection Location.

SECTION 30. Section 9.10.455 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.455 Shared Solid Waste Containers - Permit Required

A. No person shall store Residential Solid Waste on any Residential Premises other than the Residential Premises where the Residential Solid Waste was generated except in accordance with a permit issued pursuant to this Section.

B. No person shall collect Garbage, Organic Materials, or recyclables from a container shared by two (2) or more Multi-Family Dwelling Premises unless the Director has issued a permit pursuant to this Section authorizing the Residential Premises to share that container.

C. The Director may issue a permit to authorize two (2) or more Multi-Family Dwelling Premises to share Garbage, Organic Materials, or recyclables containers if all of the following conditions are satisfied:

1. The Owners of the adjacent Multi-Family Dwelling Premises, or the Owners' agents, apply to the Director, in writing, for a permit to share Garbage, Organic Materials, or recyclables containers.

2. The application for the permit includes a written statement signed by the Owner of each of the affected Premises, or the Owner's agents, designating which of the Owners will assume full responsibility for the payment of all charges for Solid Waste collection services made available to the affected Premises, designating which of the Owners shall be responsible for the maintenance of the containers and the area in which the containers are placed, and designating, by address and assessor's parcel number, which of the affected Premises shall be subject to the

special assessment procedures and charges set forth in Part 8 of this Chapter.

3. The Director has determined that placement of Garbage, Organic Materials, or Recyclable Material in the shared containers can be accomplished without transporting the Garbage, Organic Materials, or Recyclable Material on or across any public street (excluding alleys between the affected Premises).

4. The Director has determined that space constraints at the Multi-Family Dwelling Premises make it difficult to site Garbage, Organic Materials, or recyclables containers in such numbers and such sizes as will accommodate the volume of Garbage, Organic Materials, or Recyclable Material generated at the Premises.

D. The Director may impose conditions on the permit issued pursuant to subsection A. or subsection B., as determined by the Director to be consistent with the purposes and provisions of this Chapter. Such conditions may include, but are not limited to, restrictions on the number of containers, restrictions on the size or capacity of containers, and restrictions on the placement of the containers.

E. Upon written notice to the Owners of the Multi-Family Dwellings, or to the Owners' agents, the Director may revoke any permit to share Garbage, Organic Materials, recyclables or Rubbish containers given pursuant to subsection A. or B. above if the Director finds any of the following conditions exists:

1. The ownership of any of the affected Multi-Family Dwellings has changed.

2. The space constraints which made it difficult to site Garbage, Organic Materials, recyclables or Rubbish containers sufficient to accommodate

the volume of Garbage, Organic Materials, Recyclable Material or Rubbish generated at the Residential Premises no longer exist.

3. The sharing of containers is not in conformance with the conditions of the permit.

4. The bill for collection services made available at the Residential Premises remains delinquent for more than ninety (90) days.

5. The Solid Waste generated or accumulated on any of the Residential Premises is not handled in conformance with the requirements of this Chapter or applicable law.

SECTION 31. Section 9.10.457 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.457 Shared Solid Waste Containers - Commercial Premises Limitation

A. No person owning or occupying a Commercial Premise shall share a Garbage, Organic Materials, Recyclable Material or Rubbish container with another Commercial Premise if sharing the container contributes to the transportation of Garbage, Organic Materials, Recyclable Material or Rubbish on or across any public street (excluding alleys between the affected Commercial Premises).

B. No person owning or occupying a Commercial Premise shall share a Garbage, Organic Materials, Recyclable Material or Rubbish container with another Commercial Premise if sharing the container has an adverse effect on the flow of vehicular or pedestrian traffic.

SECTION 32. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.458 Solid Waste Enclosures and Rooms

A. All Solid Waste, Recyclable Material, or Organic Material produced on a Commercial Premises, Multi-Family Dwellings, or Mixed Use Developments with a Solid Waste Enclosure or Solid Waste Room shall be stored in the Solid Waste Enclosure or Solid Waste Room when such material is not set out for collection by an authorized Collector.

B. All Commercial Premises, Multi-Family Dwellings, or Mixed Use Developments constructed, enlarged, or structurally altered after January 1, 2022 shall have a Solid Waste Enclosure or Solid Waste Room. For the purposes of this Section, "structurally altered" means any change in the supporting members of a building, such as bearing walls, columns, beams, or girders. The Director may grant waiver to this requirement in accordance with Section 9.10.3020.

C. The development permit application shall show the proposed path of travel for the authorized collector to access a Solid Waste Enclosure, Solid Waste Room, or the material generated at the Premises when set out for collection. The path of travel must accommodate the required width, turning radius, and overhead clearances of the collector's vehicle. The Director may require alterations to the development application to accommodate the travel and collection activities conducted by a collector vehicle.

D. The development permit application shall show the Solid Waste Enclosure or Solid Waste Room to have sufficient capacity to accommodate containers for, at a minimum, Garbage, Recycling, and Organic Material, and containers shall be appropriately sized to accommodate the expected material that will be generated

for the Commercial Premises at the proposed frequency of collection, which must be no less than allowed in Section 9.10.1380.

SECTION 33. Section 9.10.460 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.460 Stable Matter Containers

A. Any and all Stable Matter generated within or upon any Premises or place in the City shall be placed without delay in containers meeting and complying with all specifications and requirements applicable to Garbage containers.

B. Stable Matter may be mixed with Garbage in the same Garbage container when it is to be disposed of with and in the same manner and at the same time as Garbage, permitted under the City's Solid Waste collection program.

SECTION 34. Section 9.10.480 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.480 Hazardous Materials Restrictions

A. No person shall store or accumulate any Hazardous Materials in any container used for storage or accumulation of Garbage, Rubbish, Organic Materials, Recyclable Materials, Swill, Stable Matter or other Solid Waste.

B. The primary responsibility for proper Handling of Hazardous Materials generated or accumulated on any Premises shall be on the Generator of the Hazardous Materials. Should the Generator refuse, neglect or fail to provide for the proper Handling of Hazardous Materials in accordance with applicable law, the Owner of the Premises within or upon which the Hazardous Materials has been generated

or accumulated shall provide for the proper Handling of the Hazardous Materials in accordance with applicable law.

SECTION 35. Section 9.10.520 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.520 Weekly Removal of Solid Waste

A. No person shall keep any Solid Waste or allow any Solid Waste to remain upon any Premises within the City for more than seven (7) days. At least once a week all Solid Waste generated within or on any Premises in the City shall be removed from the Premises and disposed of in accordance with the provisions of this Chapter.

B. The requirement of subsection A. for weekly removal and disposal or Processing of Solid Waste shall not apply under qualifying extenuating circumstances specified in the collector's agreement with the City or under the following circumstances:

1. Where the Solid Waste Collector normally providing collection services at the Premises is unable to perform collection services due to strikes;

2. Where severe weather conditions or "acts of God" make it impossible for the Solid Waste Collector normally providing collection services at the Premises to perform collection services using normal collection equipment; or

3. Official holidays interrupt the normal seven (7)-day collection cycle, in which case collections may be postponed to the next working day of the Solid Waste Collector.

C. The requirement for weekly removal of Solid Waste applies to all material types under the City's collection program, including Recyclable Materials, Organic Materials, Garbage and other Solid Waste.

SECTION 36. Section 9.10.525 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.525 Authorized Solid Waste Collector Required

No person shall pay or subscribe to Solid Waste collection services unless provided by a Solid Waste Collector authorized to provide Solid Waste collection services under a Solid Waste franchise granted in compliance with Part 11 or an agreement granted into under Part 7 of this Chapter, as each may be applicable.

SECTION 37. Section 9.10.530 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.530 Requirement for More Frequent Removal of Solid Waste

Where the Director or the Health Officer determines that it is necessary because of the propagation of vectors for the protection of public health, safety or welfare, or a change in applicable law that Solid Waste collection is required more frequently than once per week, the Generator of the Solid Waste shall cause more frequent collection to be performed, as required by the Director or the Health Officer.

SECTION 38. Section 9.10.550 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.550 Collection and Transportation of Solid Waste

A. No person shall collect or transport any Solid Waste within or upon any public streets in the City, or anywhere in the City, except in leakproof containers or vehicles so constructed that no Solid Waste can leak, fall, or be blown from such container or vehicle.

B. Vehicles or containers used to collect or transport Organic Materials, Garbage, Rubbish, Cannery Waste, Stable Matter or Swill shall be kept completely covered or screened at all times except when Solid Waste is being actually loaded or unloaded and except when the vehicles are moving along a collection route in the course of collection.

C. Vehicles used to collect or transport Garbage, Rubbish, Cannery Waste, Stable Matter or Swill shall be labeled with the company's name and telephone number and a unique vehicle number in letters and numbers not less than four inches high painted or stenciled on the vehicle in a location that is clearly visible to the public. Any person who applies for a Commercial Solid Waste and recyclables collection franchise pursuant to Part 11 of this Chapter shall list all collection vehicles by type and unique vehicle number together with each vehicle's Vehicle Identification Number (VIN) in the franchise application. The franchisee shall report any changes to the vehicles used in the performance of services in the City within seven (7) calendar days of the change.

D. Vehicles used to collect or transport Garbage, Rubbish, Cannery Waste, Stable Matter or Swill shall be maintained in such manner as to meet or exceed vehicle emission standards promulgated by the State of California.

E. Collection and transportation of any Solid Waste shall be so conducted that no Solid Waste will spill out of the collecting or transporting container or vehicle. Any person collecting or transporting any Solid Waste shall immediately pick up all Solid Waste which spills or is blown from the collecting or transporting container or vehicle, and shall otherwise clean the place onto which any such Solid Waste was spilled or blown.

F. No person shall transport or permit to be transported into the City any Solid Waste of any kind generated or accumulated outside the City, for the purpose of storing or disposing of it in the City, and no person shall store or dispose of any Solid Waste transported or brought into the City from outside the City, except as follows:

1. Solid Waste may be transported directly to a Solid Waste Disposal Facility for final deposition at such facility site.

2. Solid Waste may be transported directly to a Solid Waste Transfer/Processing Station for the following purposes:

   a. Transfer of the Solid Waste directly from smaller to larger vehicles for transport; or

   b. Temporary storage, separation or other Processing of the materials in the Solid Waste.

3. Recyclable waste materials may be transported directly to a Recycling Center for the purpose of Recycling.

4. Organic Materials may be transported directly to an Organic Waste Processing facility for the purpose of Processing.

5. Mixed Waste may be transported directly to a High Diversion Organic Waste Processing Facility for the purpose of Processing.

SECTION 39. Section 9.10.560 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.560 Interference with Collector Prohibited

No person shall interfere with or obstruct the authorized activities of a Solid Waste Collector, Authorized Recycling Collector, Authorized Organic Material Collector, Swill Collector or Cannery Waste collector in the collection, transportation, Processing, or disposal of Solid Waste.

SECTION 40. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.565 Self-Hauler Requirements

A. Every Self-Hauler, as defined in Part 2 of this Chapter, shall Source Separate their Recyclable Materials and Organic Materials (materials that City otherwise requires Generators to separate for collection in the City's Recyclable Materials and Organic Materials collection program) generated on-site from Solid Waste in a manner consistent with 14 CCR Section 18984.1 or 18984.2 as applicable, and the City's collection program. Self-Haulers shall deliver their materials to facilities described in this Section. Alternatively, if approved by the Director in writing, Self-Haulers may choose not to Source Separate Organic Materials and shall haul its

mixed Solid Waste (that includes Organic Material) to a High Diversion Organic Waste Processing Facility that is approved by the City.

B. Self-Haulers that Source Separate their Recyclable Materials and Organic Materials shall haul their Source Separated Recyclable Materials to a facility that recovers those materials; haul their Source Separated Organic Material to a facility, operation, activity, or property that processes or recovers Source Separated Organic Material; and, haul their Solid Waste to a disposal facility or transfer facility or operation that processes or disposes of Solid Waste; and, transport manure to a facility that manages manure in conformance with 14 CCR Article 12 and such that the manure is not landfilled, used as alternative daily cover (ADC), or used as alternative intermediate cover (AIC).

C. Self-Haulers that are Owners or responsible parties of commercial businesses or multi-family Premises shall keep records of the amount of Recyclable Materials, Organic Material, and Solid Waste delivered to each facility, operation, activity, or property that processes or recovers Recyclable Materials and Organic Material and processes or disposes of Solid Waste or shall keep records of Solid Waste delivered to High Diversion Organic Waste Processing Facilities. These records shall be subject to inspection by the City or its designee. The records shall include the following information:

1. Delivery receipts and weight tickets from the entity accepting the Recyclable Materials, Organic Materials, and Solid Waste.

2. The amount of material in cubic yards or tons transported by the Generator or responsible party to each entity.

3. If the material is transported to an entity that does not have scales on-site or employs scales incapable of weighing the Self-Hauler's vehicle in a

manner that allows it to determine the weight of materials received, the Self-Hauler is not required to record the weight of material but shall keep a record of the entities that received the Recyclable Materials, Organic Materials, and Solid Waste.

D. Self-Haulers shall retain all records and data required to be maintained by this Section for no less than five (5) years after the Recyclable Materials, Organic Materials, and/or Solid Waste was first delivered to the facility accepting the material.

E. Self-Haulers that are commercial businesses or multi-family Premises shall provide copies of records required by this Section to City if requested by the Director or their designee and shall provide the records at the frequency requested by the Director.

F. A single-family Generator or single-family responsible party that self-hauls Recyclable Materials, Organic Material, or Solid Waste is not required to record or report information in subsections C and D.

G. Pursuant to 14 CCR Section 18815.9, food waste Self-Haulers are required to maintain records and report to CalRecycle information on the tons of food waste self-hauled and the facilities or each use of such material. Upon request of the Director, food waste Self-Haulers shall provide to the City copies of all reports they are required to report to CalRecycle at a frequency specified by the Director.

SECTION 41. Section 9.10.590 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.590 Records - Maintenance, Audit and Inspection

A. Each person engaging in the business of Solid Waste collection in the City shall maintain in such person's office: (i) full and complete accounting records, prepared on an accrual basis in accordance with generally accepted accounting principles, reflecting the collector's business both within and outside of the City; (ii) customer service records and customer contact data; and (iii) all statistical, operational, programmatic and other records related to its performance as shall be necessary to provide detailed and accurate reports to demonstrate compliance with its agreement with the City and applicable law. Such books and records shall be subject to audit and inspection by the City and its authorized officers, agents and employees, at any reasonable time and at the collector's office.

B. The gross revenues derived from the collection and transportation of Solid Waste, whether such services are performed by the collector or by a subcontractor or subcontractors, shall be recorded as revenues in the accounts of the collector. The revenue accounts of the collector shall be maintained in a manner which clearly and separately identifies the revenues.

C. The collector will maintain and preserve all records and related supporting documentation for a period of not less than five (5) years following the close of each fiscal year of the collector.

D. The collector shall make available its records and related supporting documentation at any time during regular business hours for inspection and/or audit by the Director, City Manager, Director of Finance or City Auditor, or any

other duly authorized representative of the City, for a period of five (5) years following the close of each fiscal year of the collector.

E. Should any inspection or audit performed by the City or its agents disclose that the fees or other charges required to be paid by the collector, for the period under review, were understated, the collector shall pay for the cost of such audit, and shall promptly pay all fees and charges determined to be due plus interest at ten percent (10%) per year from the date due.

F. The collector's records shall be stored in one central location, physical or electronic, that can be readily accessed by collector and authorized representatives of the City. The City retains the right to require records required by this Section to be maintained in a specified format or platform, such as using a specified software platform.

SECTION 42. Part 4 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

Part 4
COLLECTION OF RECYCLABLE MATERIALS

9.10.700 Ownership of Recyclable Material

Except as provided in Sections 9.10.710, 9.10.720 and 9.10.730, upon the placement of Recyclable Material in a Designated Collection Location for collection by an Authorized Recycling Collector, the Recyclable Material shall become the property of the Authorized Recycling Collector.

9.10.710 Ownership of Organic Materials

A. Organic Materials which are placed in a Designated Collection Location for collection under the City Organic Materials Collection Program shall remain the property of the Generator until such Organic Materials are collected by the City or an authorized Organic Material collector.

B. Upon the collection of such Organic Materials, such Organic Materials shall become the property of the Authorized Organic Material Collector or of the City as set forth in the agreement for collection of Organic Materials entered into by the City and such collector.

9.10.720 Ownership of Recyclable Waste Oil

A. Waste Oil which is placed in a Designated Collection Location for collection under the City Waste Oil Collection Program shall remain the property of the Waste Oil Generator until such Waste Oil is collected by the City or an Authorized Recycling Collector.

B. Upon the collection of such Waste Oil, such Waste Oil shall become the property of the Authorized Recycling Collector or of the City as set forth in the agreement for collection of Waste Oil entered into by the City and such collector.

9.10.730 Ownership of Bulky Goods

A. Bulky Goods which are placed in a Designated Collection Location for collection by the City's authorized Residential Solid Waste Collector or by an Authorized Recycling Collector shall remain the property of the Bulky Goods Generator until such Bulky Goods are collected by such authorized collector.

B. Upon the collection of such Bulky Goods, such Bulky Goods shall become the property of the authorized Residential Solid Waste Collector or the Authorized Recycling Collector or of the City as set forth in the agreement for collection of Bulky Goods entered into by the City and such collector.

9.10.740 Unauthorized Collection Prohibited

No person, other than an Authorized Recycling Collector or Authorized Organic Material Collector, shall remove Recyclable Material or Organic Materials which have been placed in a Designated Collection Location. Any and each such removal in violation hereof from any Designated Collection Location shall constitute a separate and distinct offense.

9.10.750 Right of Individual to Handle Recyclable Material and Organic Material

A. Nothing in this Part shall limit the right of an individual person, organization or other entity to donate, sell or otherwise handle Recyclable Materials or Organic Material, provided that any such action is in accordance with the provisions of this Chapter.

B. Nothing in this Part prohibits a Generator from preventing or reducing Solid Waste generation, managing Organic Material on site, and/or using a Community Composting site pursuant to 14 CCR Section 18984.9(c).

9.10.760 Civil Action by Authorized Collector

Nothing in this Part shall be deemed to limit the right of an Authorized Recycling Collector or Authorized Organic Material Collector to bring a civil action against any person who violates Section 9.10.740 of this Chapter.

SECTION 43. The title of Part 5 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

Part 5
PROCESSING AND DISPOSAL OF SOLID WASTE

SECTION 44. Section 9.10.810 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.810 Delivery to Collector

A. Except as provided in subsection B. of this Section and in Section 9.10.820, each kind of Solid Waste shall be disposed of by delivery of the same to a collector who is authorized, pursuant to the provisions of this Chapter, to collect, transport and process or dispose of such Solid Waste. Each kind of Solid Waste shall be delivered to the collector only by placing the Solid Waste in authorized containers for each material type at the place or places where such containers are required or permitted to be kept by other provisions of this Chapter.

B. A Solid Waste Generator may dispose of Solid Waste other than by delivery to an authorized collector only under either of the following circumstances:

1. A recyclables Generator may deliver recyclables to a Recycling Center.

2. A recyclables Generator may sell or donate recyclables to any other person and may deliver such recyclables to the point of sale or the place of donation. For the purposes of this provision, "sell or donate" means the recyclables Generator receives payment for the recyclables or gives them away for free, and no payment is made by the recyclables Generator in connection with the recyclables, including any payment for use of

recyclables containers. Nothing in this provision authorizes a recyclables Generator to collect or transport recyclables generated by a person other than the recyclables Generator.

3. A Rubbish Generator may deliver Rubbish to a Solid Waste Disposal Facility or a Transfer/Processing Station, provided that no single delivery exceeds eight (8) cubic yards of Rubbish.

4. A Generator may separate food scraps to be used by the Generator or distributed to another person(s) for lawful use as animal feed, in accordance with 14 CCR Section 18983.1(b)(7). Food scraps intended for animal feed may be self-hauled by the Generator or hauled by another party.

5. A Generator may Compost or otherwise legally manage Organic Material at the site where the Organic Material is generated or at a Community Composting site.

6. A contractor may remove Solid Waste from a Premises as an incidental part of the service being performed, rather than as a separately contracted or subcontracted hauling services. Incidental material does not include residential clean-out material collected in roll-off or front-load containers rented for a period of one (1) week or less.

C. For purposes of this Chapter, Edible Food is not Solid Waste if it is recovered and not discarded and is therefore not subject to this Section. Edible Food shall be handled in accordance with Part 18 of this Chapter.

SECTION 45. Section 9.10.840 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.840 Organic Waste Recovery

A. Organic Material shall be processed through a method deemed to constitute a reduction of landfill disposal, as defined by 14 CCR Section 18983.1.b, in full compliance with the criteria set forth in 14 CCR Section 18983.1.b for each method.

B. Organic Material shall not be handled in a manner deemed to constitute landfill disposal, which includes the following dispositions of Organic Material:

1. Final deposition at a landfill.

2. Use as alternative daily cover or alternative intermediate cover at a landfill.

a. The use of non-Organic Material as landfill cover shall not constitute landfill disposal of Organic Material.

3. Any other disposition not listed in 14 CCR Section 18983.1.b.

SECTION 46. Section 9.10.860 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.860 Using Solid Waste to Prevent Erosion

A. No person shall place or deposit Solid Waste of any kind on the banks of a stream or waterway in the City unless prior written approval has been granted by

the Director and the Director of Public Works to use Solid Waste to prevent erosion of such banks.

B. The Director may grant permission to place Solid Waste on the banks of a stream or waterway to prevent erosion of the banks only if the Director finds that the place and manner of such placement will not endanger the public health and safety. The Director's approval shall be subject to such conditions and restrictions as the Director may find necessary to protect the public health and safety.

C. The Director of Public Works may grant approval to place Solid Waste on the banks of a stream or waterway to prevent erosion of the banks only if the Director of Public Works finds that the place and manner of such placement will in fact deter or prevent erosion, will not obstruct or hinder the free flow of water in a stream or waterway, and will not cause the Solid Waste to be carried away by floodwaters. The approval of the Director of Public Works shall be subject to such conditions and restrictions as the Director of Public Works may find necessary to protect the public health and safety.

D. Any approval to use Solid Waste to prevent erosion may be revoked at any time by the grantor of the approval or by the City Council.

E. Organic Material may be used as a soil amendment for erosion control, revegetation, slope stabilization, or landscaping at a landfill, provided that the material is used in a manner that complies with the criteria set forth in 14 CCR Section 18983.1.b.5.

SECTION 47. Section 9.10.870 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.870 Land Application

Land application of compostable material, consistent with 14 CCR Section 17852.a.24.5, is subject to such regulations as the Director or the Health Officer may impose to protect the public health and safety and shall comply with the conditions on particular types of compostable material used for land application set forth in 14 CCR Section 18983.1.b.6.

SECTION 48. The title of Part 6 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

Part 6
SOLID WASTE PROCESSING AND DISPOSAL FACILITIES

SECTION 49. Section 9.10.970 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.970 Disposal Facility Operator Integrated Waste Management Fee

A. Each operator of a disposal facility located in the City shall pay a disposal facility operator integrated waste management fee as set forth in the schedule of fees adopted by resolution of the City Council. Such fee shall be based on the types or amounts of wastes accepted at the disposal facility and shall be used to pay the costs incurred by the City in: (i) preparing, adopting and implementing the Integrated Waste Management Plan required under Division 30 of the California Public Resources Code; and (ii) implementing Organic Material and Recyclable Materials diversion programs and services for compliance with current and future

applicable law, including, but not limited to, AB 341, AB 1826, and SB 1383. The City shall retain the sole right to set priorities for the use of its disposal facility operator integrated waste management fee.

B. The disposal facility operator integrated waste management fee shall be due and payable to the City at the same time as business taxes are due and payable under Chapter 4.76 of this Code or disposal facility taxes are due and payable under Chapter 4.78 of this Code.

C. For the purposes of this Section 9.10.970, "disposal facility" means any facility or location where disposal of Solid Waste occurs and any Composting facility or location required to obtain a permit under Division 30 of the California Public Resources Code. "Disposal facility" does not include a facility utilized to receive Solid Wastes for the purpose of Recycling, separation or other Processing of the materials in the Solid Wastes, or for the purpose of transferring the Solid Wastes directly from smaller to larger vehicles for transport, where the permanent disposal of Solid Wastes on the site does not occur.

SECTION 50. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.990 Organic Waste Recovery Capacity

A. Owners of facilities, operations, and activities located in the City's boundaries that recover Organic Material, including, but not limited to, Compost facilities, in-vessel digestion facilities, and publicly-owned treatment works shall, upon City request, provide information regarding available and potential new or expanded capacity at their facilities, operations, and activities, including information about, throughout, and permitted capacity necessary for planning purposes. Entities contacted by the City shall respond within sixty (60) calendar days.

B. Community Composting operators with operations located in the City's boundaries, upon City request, shall provide information to the City to support Organic Material capacity planning, including, but not limited to, an estimate of the amount of Organic Material anticipated to be handled at the Community Composting operation. Entities contacted by the City shall respond within sixty (60) calendar days.

SECTION 51. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.995 Regulatory Reporting

Owners of facilities, operations, and activities located in the City's boundaries that receive Recyclable Materials, Organic Materials, and/or Solid Waste shall provide to the City on a quarterly basis copies of all reports they are required to report to CalRecycle, including, at minimum, those required by law.

SECTION 52 Section 9.10.1010 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1010 Mandatory Solid Waste, Recyclable Materials, and Organic Materials Collection Service

A. Each Residential Premises in the City shall be provided Solid Waste, Recyclable Materials, and Organic Materials collection services at least once per week regardless of whether the Premises are occupied and regardless of whether Solid Wastes are set out for collection.

B. No Owner of a Residential Premises shall prohibit or prevent the provision of weekly Solid Waste collection services, including recyclables and Organic Materials collection, at the Premises.

C. All Residential Premises shall subscribe to and pay for the City's collection services for weekly collection of Recyclable Materials, Organic Materials, and other Solid Waste generated by the Residential Premises and comply with requirements of those services. The City's standard collection services for residential Generators includes Source Separated Recyclable Materials container collection, uncontainerized Yard Waste collection, and Mixed Waste container collection, which permits the commingling of Garbage and food waste in the Mixed Waste container. The City retains the right to transition to different or additional container collection system(s), which may require additional Source Separation by the Generator, such as a three (3)-container collection system for Source Separated Recyclable Materials, Source Separated Organic Materials, and Solid Waste; and Generators shall subscribe to, participate in, and pay for such alternative collection system upon direction from the City.

D. The City shall have the right to review the number and size of a Generator's containers and/or uncontainerized service level to evaluate adequacy of capacity provided for each type of collection service for proper separation and containment of materials. The responsible party of the Residential Premises shall adjust their service level for their collection services as requested by the Director.

SECTION 53. Section 9.10.1030 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1030 Authorization of Solid Waste Collection Service

A. The Director shall authorize the Solid Waste Collector to provide Residential Solid Waste collection service and shall determine the level of service and frequency of collection to be provided at each Residential Premises, which shall be not less than one (1) time per week.

B. When in the judgment of the Director additional collection services are required, the Director shall authorize the Solid Waste Collector to provide such additional services.

C. In the event the Director authorizes the Solid Waste Collector to collect Solid Waste from a recyclables container or Organic Materials container whose contents have been determined to be too contaminated to be collected as recyclables or Organic Materials, the Owner of the Premises from which the contaminated materials are collected shall pay a fee for such collection in an amount set forth by resolution of the City Council.

SECTION 54. Section 9.10.1060 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1060 Recyclables and Organic Materials Containers Permitted

A. Except as provided in Section 9.10.1080, no Owner of a Single-Family Dwelling and no Generator of any Solid Waste generated at such Premises shall set out Recyclable Material for collection by the City's authorized Residential Solid

Waste Collector except in a container meeting one (1) of the following descriptions:

1. A wheeled recyclables disposal cart provided by the City or by the City's authorized Residential Solid Waste Collector, which together with its contents does not exceed the following weight limits:

    a. Eighty (80) pounds for a cart with a capacity of twenty (20) gallons;

    b. One hundred (100) pounds for a cart with a capacity of thirty-two (32) gallons;

    c. One hundred seventy-five (175) pounds for a cart with a capacity of sixty-four (64) gallons; or

    d. Two hundred fifty (250) pounds for a cart with a capacity of ninety-six (96) gallons.

2. A clean, brown Kraft paper bag which the Owner or producer has marked for Recycling, and which together with its contents does not exceed a weight of sixty pounds.

3. A Garbage can which meets the following requirements:

    a. The can must be constructed of metal, plastic or other substantial nonabsorbent material.

    b. The can must be of sufficient strength and rigidity to hold without collapse all Recyclable Material deposited and kept therein and

must be of sufficient strength and rigidity to prevent the can from being broken or crushed under ordinary conditions of use.

c. The can must have a close-fitting cover.

d. The can must be equipped with two attached handles or bales, one on each side of the container, of sufficient strength and size and so located to facilitate the lifting and Handling of the container.

e. The can must be leakproof.

f. The can must be free of sharp, rough or jagged surfaces or edges likely to cause injury to persons lifting or Handling the container.

g. The can must be of such shape that it can be lifted and handled without unreasonable strain by one person.

h. The can must not exceed thirty-two (32) gallons in capacity.

i. The can together with its contents must not exceed sixty (60) pounds in weight.

4. A Waste Oil container or Waste Oil filter bag described in Section 9.10.1070.

5. For Organic Materials, any of the following:

a. A Yard Waste tarp provided by the City or the City's authorized Yard Waste collector.

b. A wheeled Yard Waste cart or Source Separated Organic Materials cart provided by the City or the City's Authorized Organic Material Collector, which together with its contents meets the weight limitations for recyclables carts set out in paragraph 1. above.

c. A Garbage can which meets the requirements set out in paragraph 3. above.

B. Except as provided in Section 9.10.1080, no Owner of a Multi-Family Dwelling and no Generator of any Solid Waste generated at such Premises shall set out Recyclable Material for collection by the City's authorized Residential Solid Waste Collector except in a container meeting one of the following descriptions:

1. A wheeled recyclables collection cart provided by the City or by the City's authorized Residential Solid Waste Collector.

2. A clean, brown Kraft paper bag or corrugated cardboard box which the Owner or producer has marked for Recycling, and which together with its contents does not exceed a weight of sixty (60) pounds.

3. A recyclables collection bin provided by the City or by the City's authorized Residential Solid Waste Collector.

4. A three (3)-cubic-yard or four-cubic-yard mesh container provided by the City or by the City's authorized Residential Solid Waste Collector. The mesh container shall be used only for setouts of corrugated cardboard.

5. A Waste Oil container or Waste Oil filter container described in Section 9.10.1070.

6. A Yard Waste container, or Source Separated Organic Materials cart provided by the City or by the City's Authorized Organic Material Collector.

C. Notwithstanding this Section, all containers shall comply with the color and labeling standards and replacement timeline set forth in 14 CCR, Division 7, Chapter 12, Article 3. Uncontainerized collection standards shall be in accordance with the requirements of 14 CCR, Division 7, Chapter 12, Article 3. The Director retains the right to require Generators to use specified container types or collection methods at any time, including, but not limited to, standardized containers provided by the City's authorized collectors.

SECTION 55. Section 9.10.1080 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1080 Setout of Uncontainerized Yard Waste and Recyclable Material

No person shall place uncontainerized Yard Waste or Recyclable Material on any sidewalk, in any street, or in any other public right-of-way except in accordance with the following:

A. Except as provided in subsection B., the Owner of a Residential Premises or the Generator of Yard Waste at such Premises may set out Yard Waste for collection by the City's authorized Yard Waste collector by placing the Yard Waste or the Yard Waste container in the street in front of the Residential Premises where the Yard Waste were generated or, if the Residential Premises is on a corner lot, the set-out may be in the portion of the street that is along the side of the Premises. The Yard Waste shall be set out in piles that do not exceed five (5) feet in any dimension and shall be placed not less than one (1) foot from the curb or the edge of the street.

B. At any Residential Premises which have been determined by the Director to be ineligible for in-street placement, the Owner of the Residential Premises or the Generator of Yard Waste at such Premises shall set out Yard Waste for collection in Yard Waste containers provided by the City's authorized Yard Waste collector or Source Separated Organic Materials containers provided by the City's Authorized Organic Material Collector for Yard Waste collection and shall place such containers on the public parkway in front of the Premises where the Yard Waste were generated. The Director may require Generators to use containerized service for Yard Waste, at the Director's discretion.

C. The Owner of a Residential Premises or the Generator of Bulky Goods generated at such Premises may set out Bulky Goods for collection by the City's authorized Residential Solid Waste Collector by placing the Bulky Goods on the public parkway in front of the Premises where the Bulky Goods were generated.

D. The Owner of a Residential Premises or the Generator of waste corrugated cardboard generated at such Premises may set out uncontainerized corrugated cardboard for collection by the City's authorized residential Recycling collector by placing the cardboard in the public parkway in front of the Premises where the corrugated cardboard was generated except at Premises where the City or the City's authorized residential Recycling collector has provided a recyclables container for corrugated cardboard.

SECTION 56. Section 9.10.1090 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1090 Debris Boxes for Residential Rubbish

A. The Owner of a Residential Premises or the Generator of residential Rubbish may store Rubbish generated at such Premises as a result of demolition,

construction, remodeling, cleanup or landscaping at the Premises in a Rubbish debris box for collection by a Solid Waste Collector authorized to provide Rubbish collection services pursuant to a Commercial Solid Waste franchise granted in accordance with Part 11 of this Chapter.

B. Any debris box used for the storage of residential Rubbish shall meet all of the following requirements:

1. The debris box must be provided at the Residential Premises by the Solid Waste Collector that performs the collection of the Rubbish stored in the debris box.

2. The debris box must be either a Rubbish container designed for mechanical collection by a collection vehicle or must be a roll-off box.

3. The debris box must be placed on the Premises or in the street in front of the Premises where the Rubbish is generated.

4. The debris box must not remain at the Premises for more than fourteen (14) consecutive days.

5. The debris box must comply with the container color and labeling standards for applicable material types specified in 14 CCR, Division 7, Chapter 12, Article 3, in accordance with the compliance timeline specified in that Article.

C. No Owner of the Residential Premises and no Generator of the residential Rubbish shall place any Garbage in the debris box nor permit any other person to place any Garbage in the debris box.

D. For the purposes of this Chapter 9.10, Rubbish collected from a debris box pursuant to this Section 9.10.1090 shall be deemed Commercial Solid Waste and the Owner of the Residential Premises or the Generator of the Rubbish shall be a Commercial Solid Waste Generator with respect to such Rubbish.

SECTION 57. Section 9.10.1100 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1100 Placement of Solid Waste

A. No person shall keep any Garbage container, nor permit any Garbage container to remain, in the street or upon the public parkway except during the period from noon on the day preceding the scheduled collection day to noon on the day immediately following collection.

1. For Single-Family Dwellings and for Multi-Family Dwellings receiving wheeled Garbage disposal cart collection service, during the period beginning the day preceding the scheduled collection day and ending the day immediately following the scheduled collection day.

2. For Multi-Family Dwellings receiving Garbage disposal bin collection service, during the period from noon on the day preceding the scheduled collection day to 11:59 p.m. on the scheduled collection day.

B. No person shall keep any recyclables container, nor permit any recyclables container to remain, in the street or upon the public parkway except:

1. For Single-Family Dwellings and for Multi-Family Dwellings receiving wheeled recyclables disposal cart collection service, during the period

beginning the day preceding the scheduled collection day and ending the day immediately following the scheduled collection day.

2. For Multi-Family Dwellings receiving recyclables bin collection service, during the period from noon on the day preceding the scheduled collection day to 11:59 p.m. on the scheduled collection day.

C. No person shall place uncontainerized corrugated cardboard, nor permit any uncontainerized corrugated cardboard to remain, in the public parkway except during the period beginning the day preceding the scheduled collection day and ending the day immediately following the scheduled collection day.

D. No person shall keep any uncontainerized Yard Waste, nor permit any uncontainerized Yard Waste to remain, in the street or upon the public parkway except during the period beginning the day preceding the scheduled collection day and ending the day immediately following the scheduled collection day.

E. No person shall keep any Bulky Goods, nor permit any Bulky Goods to remain, in the street or upon the public parkway except during the period beginning the day preceding the scheduled collection day and ending the day immediately following the scheduled collection day.

F. No person shall keep any Yard Waste tarp or container, nor permit any Yard Waste tarp or container to remain, in the street or upon the public parkway except during the period beginning the day preceding the scheduled collection day and ending the day immediately following the scheduled collection day.

G. No person shall keep any Waste Oil container, nor permit any Waste Oil container to remain, in the street or upon the public parkway except during the

period beginning the day preceding the scheduled collection day and ending the day immediately following the scheduled collection day.

H. The Owner of a Single-Family Dwelling or the Generator of Solid Waste at such Premises shall set out all Solid Waste and Solid Waste containers only in the portion of the street or on the portion of the public parkway, as applicable, that is in front of the Single-Family Dwelling where the Solid Waste was generated, except:

1. If the Single-Family Dwelling is on a corner lot, the set-out may be in the portion of the street or the portion of the public parkway, as applicable, that is along the side of the Single-Family Dwelling property.

2. If the Single-Family Dwelling receives, or is required to have, on-Premises collection service, the Owner or Generator shall place the containers in an accessible location that is not more than one hundred (100) yards from the curb or the edge of the street in front of the property.

I. All Solid Waste containers at Multi-Family Dwellings shall be set out for collection either in a location that is readily accessible by the collection vehicles or in a location that is at-grade with the collection vehicle access.

J. In any case where a Single-Family Dwelling is located on a private street that does not permit access for the Solid Waste collection vehicles, the Owner of the Single-Family Dwelling, or their property manager, homeowner association, or conservator, shall subscribe to and pay for on-Premises collection service.

K. In the event the Director determines that Garbage or recyclables containers have been left in the street or upon the public parkway in violation of paragraph A.2. or B.2. above in such a manner as to hinder parking or traffic flow or in such a

manner as to pose a threat to public health or safety, the Director may require the Owner of the Multi-Family Dwelling where such violation occurs to subscribe to and pay for "bin push services" (where the Solid Waste Collector moves the bins to the street for collection and moves them back onto the Premises after collection) for Garbage collection, recyclables collection or both.

L. Except when the containers are set out for collection, the Solid Waste Generator shall keep and maintain all Solid Waste containers within the side or rear yard of the Premises where the Solid Waste is generated.

SECTION 58. Section 9.10.1110 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1110 Unauthorized Use of Containers Prohibited

No person shall use, nor permit the use of, any Garbage container, any recyclables container, any Yard Waste tarp or container, any Waste Oil container, or any other container provided by the City or the City's authorized Solid Waste Collector, the City's Authorized Organic Material Collector, or the City's authorized residential Recycling collector except for such container's intended use.

SECTION 59. Section 9.10.1120 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1120 Residential Source Reduction and Recycling Fee

A. Each Residential Solid Waste Generator in the City shall pay a Source Reduction and Recycling Fee as set forth in the Schedule of Fees adopted by resolution of the City Council. Such fee shall be used to pay the costs incurred by the City in: (i) preparing, adopting and implementing the Integrated Waste Management Plan

required under Division 30 of the California Public Resources Code; and (ii) implementing Organic Material and Recyclable Materials diversion programs and services for compliance with current and future applicable law, including, but not limited to, AB 341, AB 1826, and SB 1383. However, the City shall retain the sole right to set priorities for the use of its Source Reduction and Recycling Fee.

B. Each Residential Solid Waste Generator shall remit the Source Reduction and Recycling Fee to the City at the same time as the Residential Solid Waste Generator remits payment to the City for Solid Waste collection services.

C. If a Residential Solid Waste Generator fails or refuses to pay the Source Reduction and Recycling Fee when said fee is due and payable, the unpaid fee shall constitute a delinquent Solid Waste collection service bill subject to the procedures set out in Part 8 of this Chapter.

D. For the purposes of this Section, the Solid Waste Generator at Multi-Family Dwellings shall be deemed to be the Owner of the Multi-Family Dwelling.

E. For the purposes of this Section, the Solid Waste Generator at a mobilehome park shall be deemed to be the Owner of the mobilehome park.

SECTION 60. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.1130 Additional Multi-Family Dwelling Requirements

This Section shall apply to Multi-Family Dwellings with five (5) or more individual dwelling units, which are considered to be commercial businesses under SB 1383 regulations, unless otherwise specified. The Owner or responsible party of multi-family Premises with five (5) or more units shall:

A. Provide or arrange for Recyclable Materials, Organic Materials, and Solid Waste collection services consistent with this Chapter for employees, contractors, and Tenants. The responsible party of the multi-family Premises shall subscribe to and pay for collection services and comply with requirements of those services for all Recyclable Materials, Organic Materials, and Solid Waste/Mixed Waste generated at the multi-family Premises in accordance with this Part. The City shall have the right to review the number and size of the multi-family Premises' collection containers and frequency of collection to evaluate adequacy of capacity provided for each type of collection service for proper separation of materials and containment of materials. The responsible party of a multi-family Premises shall adjust their service level for their collection services as requested by the Director or their designee.

B. Allow access to adequate number, size, and location of collection containers with sufficient labels or colors for employees, contractors, Tenants, and customers, consistent with City's Recyclable Materials container, Organic Materials container, and Solid Waste container collection service or, if self-hauling, consistent with the multi-family Premises' approach to complying with Self-Hauler requirements in Section 9.10.565.

C. Annually provide information to employees, contractors, Tenants, and customers about Recyclable Materials and Organic Material recovery requirements and about proper sorting of Recyclable Materials, Organic Materials, and Solid Waste/Mixed Waste.

D. Provide education information before or within fourteen (14) days of occupation of the Premises to new Tenants that describes Source Separation requirements under the City's collection programs for Recyclable Materials, Yard Waste,

Organic Materials, Mixed Waste, and other Solid Waste, as applicable; and the location of containers and the rules governing their use at each property.

E. Provide or arrange access for the Director or their designee to their properties during all inspections conducted in accordance with this Chapter to confirm compliance with the requirements of this Chapter.

SECTION 61. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.1140 Residential Care Facilities Serving Six Persons or Fewer

Residential Care Facilities serving six (6) persons or fewer shall be treated as a residential premise subject to the requirements of this Part. However, such facilities may choose to be served by the Commercial Solid Waste hauler and subject to the requirements of Part 9.

SECTION 62. Section 9.10.1370 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1370 Recyclables and Organic Materials Collection Authorization Required

A. No person shall engage in the business of collection of Recyclable Material or Organic Materials from Commercial Premises unless such person has a valid Commercial Solid Waste and recyclables collection franchise and/or Organic Materials collection franchise, as applicable, granted pursuant to Part 11 of this Chapter.

B. A person shall be deemed to be engaged in the business of collection of Recyclable Material or Organic Materials, when such person removes from the

Premises Recyclable Materials or Organic Materials which have been segregated from other Solid Waste and stored in a container separate from other Solid Waste, whether or not such person receives compensation for Handling the Recyclable Material or Organic Materials if such person is compensated for other services.

C. A person shall not be deemed to be engaged in the business of Recyclable Material or Organic Materials collection where the removal is of the following material:

1. Source Separated recyclables or Organic Materials sold or donated by the Generator where the Generator does not incur any cost for collection, transportation, Processing or any other service provided by the person collecting the Recyclable Material or Organic Materials.

2. Secure document shredding.

3. Recyclable Material or Organic Materials that are generated at a Commercial Premises that is transported by the Generator, in a vehicle owned by the Generator or Generator's company and operated by the Generator or an employee of the Generator's company, for which there is no compensation to the hauler.

4. Food scraps that are separated by the Generator and used by the Generator or distributed to other person(s) for lawful use as animal feed, in accordance with 14 CCR Section 18983.1(b)(7).

5. Organic Material composted or otherwise legally managed at the site where it is generated or at a Community Composting site.

SECTION 63. Section 9.10.1380 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1380 Mandatory Solid Waste, Recyclable Materials, and Organic Materials Collection

A. The Owner of a Commercial Premises or the Generator of Solid Waste at such Premises or the agent of the Owner or Generator shall subscribe to and pay for Solid Waste, Recyclable Materials, and Organic Materials collection services provided by a Solid Waste Collector authorized to provide Commercial Solid Waste collection services pursuant to Section 9.10.1350.

B. The minimum level of service to which the Owner, Generator or agent shall subscribe shall be the number and size of Solid Waste containers suitable for Garbage collection and the frequency of collection which is necessary for the removal and disposal of all Solid Waste generated at the Premises, which shall be not less than one (1) time per week.

C. The minimum level of service necessary for the collection of all Solid Waste, Recyclable Materials, and Organic Materials generated at any Commercial Premises in a seven (7)-day period shall be determined by the Owner, Generator or agent and the Solid Waste Collector. In the event the Owner, Generator or agent and the Solid Waste Collector do not agree on the minimum level of service necessary, such determination shall be made by the Director or the Health Officer and shall be a minimum of thirty-two (32) gallons of Recycling collection service and thirty-two (32) gallons of organics Recycling collection service for every one (1) cubic yard of Solid Waste generated per week. In other words, for every two (2) cubic yards of Solid Waste generated per week, there must be at least sixty-four (64) gallons of Recycling collection service and sixty-four (64) gallons or organics Recycling collection service per week. The Director

or their designee may grant exemptions to this requirement if the business can demonstrate that they do not produce thirty-two (32) gallons of Organic Material or thirty-two (32) gallons of Recycling per week.

D. The Director or their designee shall have the right to review the number and size of a Commercial Premises' containers and frequency of collection to evaluate adequacy of capacity provided for each type of collection service for proper separation and containment of materials. The responsible party of the commercial business shall adjust their service level for their collection services as requested by the Director or their designee.

E. Nothing in this Chapter prohibits an Owner or a Generator of a commercial business from preventing or reducing discarded materials generation, managing Organic Material on site, or using a Community Composting site pursuant to 14 CCR Section 18984.9(c).

SECTION 64. Section 9.10.1395 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1395 Recycling and Organic Material Containers Permitted

A. All Recycling and Organic Material containers used in the City shall be nonabsorbent, watertight, vector-resistant, durable, easily cleanable, and designed for safe Handling.

B. The Generator shall keep and maintain all Recycling and Organic Material containers in a place or manner that does not impede normal vehicular traffic, public transportation or pedestrian or wheelchair access to public rights-of-way except when the containers are set out for collection.

C. The Generator shall not cause or permit any Recycling container or an Organic Material container to be filled in a manner which causes the container to overflow, or any offensive vapors, gases or odors to leak from the container except when the Recyclable Material or Organic Material is being placed into or removed from the Recycling or Organic Material container. Placing the container inside of an enclosure or providing a permanent/affixed lid are acceptable forms of covering the container. Roll-off boxes shall be covered by tarps or other covers which prevent water from intruding into the container.

D. The Generator shall keep any Recycling or Organic Material container clean and sanitary; and maintain the container as may be necessary to repel and keep away flies and rodents.

E. The Generator shall not cause or permit the Recyclable Material or Organic Material to be so compacted or otherwise placed, kept or accumulated in any container in a manner which does not allow the contents of the container to fall out, by their own weight, upon the container being lifted and turned upside down.

F. No Owner of any Commercial Premises and no Generator of Recyclable Material or Organic Material at such Premises shall store or accumulate Recyclable Material or Organic Material at such Premises except in a container described in Section 9.10.1390 or in a container meeting one of the following descriptions:

1. A roll-off box: A metal container that must be loaded on a collection vehicle and has the capacity to contain to forty (40) cubic yards of material.

2. A front-load container: A collection container designed to be emptied mechanically by a collection vehicle, is constructed of metal or plastic, and is one (1) to eight (8) cubic yards in size.

3. Other types: Recycling container composed of durable plastic (such as carts and woven polypropylene bags) or metal that are designed to collect Solid Waste.

G. The Owner of any Recycling container or Organic Material container used for the storage or accumulation of Recyclable Material or Organic Material at Commercial Premises shall maintain the Recycling container free of graffiti, and shall remove any graffiti from such container within forty-eight (48) hours of notification by the City that there is graffiti on the container.

SECTION 65. Section 9.10.1410 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1410 Placement of Solid Waste Containers

No Commercial Solid Waste Container or Rubbish container shall be kept or permitted to remain upon the public Furnishing Zone/Parkstrip, as defined in Section 11.04.110, except during the twelve (12) hours immediately preceding the scheduled time of collection by the Solid Waste Collector and during the six (6) hours immediately following collection. No Commercial Solid Waste or Rubbish container shall otherwise be placed, kept or maintained within or upon any public sidewalk, Furnishing Zone/Parkstrip, curb, gutter, alley, street, or other public right-of-way.

SECTION 66. Section 9.10.1420 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1420 Labeling and Color of Containers

Each commercial container that is provided at any Commercial Premises by an authorized collector for collection of Solid Waste, Recyclable Materials, or Organic Materials shall be labeled by the authorized collector with the name and telephone number of the authorized collector. Each container must include text which reads "Clean Up All Leaks/Spills Promptly." All labels required by this Section shall be in letters not less than four (4) inches high. Containers provided by an authorized collector shall comply with the container color and label requirements and compliance timeline set forth in 14 CCR, Division 7, Chapter 12, Article 3, or as otherwise specified by the Director.

SECTION 67. Section 9.10.1430 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1430 Hours of Collection

A. No Solid Waste, Organic Materials, or Commingled Recyclables shall be collected, taken, moved or transported from any Commercial Premises that is within three hundred (300) feet of any Residential Premises, except between the hours of 6:00 a.m. and 6:00 p.m. of any day. The Director may grant an exception to these collection limitations if the Solid Waste Collector demonstrates to the satisfaction of the Director that such exception will not create noise, impediment of traffic flow, or other interference with the quiet enjoyment of the Residential Premises.

B. The Director may impose restrictions on the hours of collection from Commercial Premises in addition to the restrictions set forth in subsection A. if the Director determines that additional time limitations are needed to mitigate an impediment to traffic flow on an interference with the quiet enjoyment of adjacent Residential Premises.

C. The limitations in this Section do not apply to Solid Waste, Organic Materials, or recyclables collection from City facilities or to Solid Waste, Organic Materials, or recyclables collection performed in connection with City-sponsored activities or events.

SECTION 68. Section 9.10.1435 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1435 Commercial Source Reduction and Recycling Fee

A. Each Commercial Solid Waste Generator in the City shall pay a Source Reduction and Recycling Fee as set forth in the schedule of fees adopted by resolution of the City Council. Such fee shall be based on the types or amounts of Commercial Solid Waste produced and shall be used to pay the costs incurred by the City in: (i) preparing, adopting and implementing the Integrated Waste Management Plan required under Division 30 of the California Public Resources Code; and (ii) implementing Organic Material and Recyclable Materials diversion programs and services for compliance with current and future applicable law, including, but not limited to, AB 341, AB 1826, and SB 1383. The City shall retain the sole right to set priorities for the use of its Source Reduction and Recycling Fee.

B. Each Commercial Solid Waste Generator shall pay the Source Reduction and Recycling Fee to the Solid Waste Collector authorized by the City to provide

Commercial Solid Waste collection services. Said fee shall be due and payable at such times as the fees or charges for Solid Waste collection services are due and payable to the Commercial Solid Waste Collector.

C. The Commercial Solid Waste Collector shall remit to the City the Source Reduction and Recycling Fee, paid to the Commercial Solid Waste Collector by the Commercial Solid Waste Generators, at the time the Commercial Solid Waste Collector submits franchise fees under Section 9.10.1710. The fees shall be remitted to the City's Director of Finance and shall be accompanied by a written statement, verified by the person making the payment or a duly authorized representative of the person, showing the calculation of the remitted fees in such form and detail as the Director of Finance may require and showing such other information as the Director of Finance may determine is material to a determination of the amount due.

D. If a Commercial Solid Waste Generator fails or refuses to pay the Source Reduction and Recycling Fee when said fee is due and payable, the City may collect the fee, plus any late payment charges set forth in the schedule of fees adopted by resolution of the City Council, directly from the Commercial Solid Waste Generator or from the Owner of the Premises to which Commercial Solid Waste collection services have been provided by the Solid Waste Collector.

E. If, within the time specified in Section 9.10.1710, the Solid Waste Collector fails to remit to the City the Source Reduction and Recycling Fees paid to the Solid Waste Collector by the Commercial Solid Waste Generator, the Solid Waste Collector shall pay to the City a late payment charge in an amount equal to ten percent (10%) of the Source Reduction and Recycling Fees that were not timely remitted. If the Solid Waste Collector fails to remit such fees within thirty (30) days of the date required by Section 9.10.1710, the Solid Waste Collector shall pay a second late payment charge in an amount equal to ten percent (10%) of

the Source Reduction and Recycling Fees that were not remitted within the thirty (30)-day period. Such second late payment charge shall be in addition to the first late payment charge. In addition, the Solid Waste Collector shall pay interest on all Source Reduction and Recycling Fees that were paid to the Solid Waste Collector by the Solid Waste Generators but not timely remitted to the City at the rate of ten percent (10%) per annum or the legal rate allowed, whichever is less, from the date said fees were due to the date actually remitted.

F. In the event a Commercial Solid Waste Generator fails or refuses to pay the Source Reduction and Recycling Fee to the Commercial Solid Waste Collector at the time the fees or charges for Solid Waste collection services are due and payable to the Solid Waste Collector, the Solid Waste Collector shall notify the City of the name and address of the Solid Waste Generator who refused or failed to pay the Source Reduction and Recycling Fee for the applicable reporting period and shall provide to the City such additional account information (including the size of the Solid Waste containers, the frequency of collection, and the amount of the Source Reduction and Recycling Fee the Generator failed or refused to pay) sufficient for the City to pursue collection of the unpaid fee from the Generator. Such information shall be provided by the Commercial Solid Waste Collector, in the form specified by the Director or the Director of Finance, at the time the Commercial Solid Waste Collector submits franchise fees under Section 9.10.1710. The Commercial Solid Waste Collector may, in lieu of providing the information required by this subsection F., pay to the City the Source Reduction and Recycling Fees otherwise payable by the Commercial Solid Waste Generator.

G. Any person authorized to perform commercial collection services in the City pursuant to a franchise based on a geographic service district shall pay a Source Reduction and Recycling Fee as set forth in the schedule of fees adopted by resolution of the City Council. Such fee shall be based on the types or amounts

of Commercial Solid Waste produced and shall be used to pay the costs incurred by the City in: (i) preparing, adopting and implementing the Integrated Waste Management Plan required under Division 30 of the California Public Resources Code; and (ii) implementing Organic Material and Recyclable Materials diversion programs and services for compliance with current and future applicable law, including, but not limited to, AB 341, AB 1826, and SB 1383. The City shall retain the sole right to set priorities for the use of its Source Reduction and Recycling Fee.

H. The Commercial Solid Waste Collector shall remit to the City the Source Reduction and Recycling Fee at the time the Commercial Solid Waste Collector submits franchise fees under Section 9.10.1710. The fees shall be remitted to the City's Director of Finance and shall be accompanied by a written statement, verified by the person making the payment or a duly authorized representative of the person, showing the calculation of the remitted fees in such form and detail as the Director of Finance may require and showing such other information as the Director of Finance may determine is material to a determination of the amount due.

I. If, within the time specified in Section 9.10.1710, the Solid Waste Collector fails to remit to the City the Source Reduction and Recycling Fees, the Solid Waste Collector shall pay to the City a late payment charge in an amount equal to ten percent (10%) of the Source Reduction and Recycling Fees that were not timely remitted. If the Solid Waste Collector fails to remit such fees within thirty (30) days of the date required by Section 9.10.1710, the Solid Waste Collector shall pay a second late payment charge in an amount equal to ten percent (10%) of the Source Reduction and Recycling Fees that were not remitted within the thirty (30)-day period. Such second late payment charge shall be in addition to the first late payment charge. In addition, the Solid Waste Collector shall pay interest on all Source Reduction and Recycling Fees that were not timely remitted to the City

at the rate of ten percent (10%) per annum or the legal rate allowed, whichever is less, from the date said fees were due to the date actually remitted.

SECTION 69. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.1436 Other Requirements for Commercial Businesses

A. Owners of commercial businesses shall supply and allow access to adequate number, size and location of collection containers with sufficient labels or colors (conforming with Section 9.10.1436.B below) for employees, contractors, Tenants, and customers, consistent with City's Recyclable Materials container, Organic Materials container, and Solid Waste container collection service or, if self-hauling, consistent with the Commercial Premises' approach to complying with Self-Hauler requirements.

B. Owners of commercial businesses shall provide containers for the collection of Source Separated Recyclable Materials and Source Separated Organic Materials in all indoor and outdoor areas where Solid Waste containers are provided for customers, for materials generated by that commercial business. Such containers shall be visible and easily accessible. Such containers do not need to be provided in restrooms. If a commercial business does not generate any of the materials that would be collected in one type of container, then the commercial business does not have to provide that particular container in all areas where Solid Waste containers are provided for customers. Pursuant to 14 CCR Section 18984.9(b), the containers provided by the commercial business shall have one (1) or both of the following:

1. A body or lid that conforms with the container colors provided through the collection service provided by City, with either lids conforming to the color

requirements or bodies conforming to the color requirements or both lids and bodies conforming to color requirements. The commercial business is not required to replace functional containers, including containers purchased prior to January 1, 2022, that do not comply with the requirements of this subsection prior to the end of the useful life of those containers, or prior to January 1, 2036, whichever comes first.

2. Container labels that include language or graphic images, or both, indicating the primary material accepted and the primary materials prohibited in that container, or containers with imprinted text or graphic images that indicate the primary materials accepted and primary materials prohibited in the container. Pursuant 14 CCR Section 18984.8, the container labeling requirements are required on new containers commencing January 1, 2022.

C. To the extent practical through education, training, Inspection, and/or other measures, the Owner of the commercial business shall prohibit employees from placing materials in a container not designated for those materials per the City's Recyclable Materials, Organic Materials, and Solid Waste collection service or, if self-hauling, per the instructions of the commercial business' responsible party to support its compliance with requirements of this Chapter.

D. The Owner of the commercial business shall periodically inspect Recyclable Materials containers, Organic Materials containers, and Solid Waste containers for Prohibited Container Contaminants and inform employees if containers are contaminated and of the requirements to keep contaminants out of those containers pursuant to 14 CCR Section 18984.9(b)(3).

E. The Owner of the commercial business shall annually provide information to employees, contractors, Tenants, and customers about Recyclable Materials and

Organic Material recovery requirements and about proper sorting of Recyclable Materials, Organic Materials, and Solid Waste.

F. The Owner of the commercial business shall provide education information before or within fourteen (14) days of occupation of the Premises to new Tenants that describes requirements to Source Separate Recyclable Materials, Organic Materials, and Solid Waste in accordance with the City's collection programs and the location of containers and the rules governing their use at each property.

G. The Owner of the commercial business shall provide or arrange access for the Director or their designee to their properties during all inspections conducted in accordance with this Chapter to confirm compliance with the requirements of this Chapter.

H. If the Owner of a commercial business wishes to self-haul materials, the Owner of the commercial business shall meet the self-haul requirements of this Chapter.

SECTION 70. Section 9.10.1445 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1445 Large Event and Large Venue Requirements

A. Any person seeking permission to conduct a Large Event, as defined in Part 2, where the event generates Solid Waste such as, but not limited to, paper, beverage containers, or food shall develop a waste reduction and Recycling strategy and shall file a copy of the strategy with the City's Director of Environmental Services. The waste reduction and Recycling strategy shall include an estimate of the amount and types of waste anticipated from the event, proposed actions to reduce the amount of waste generation related to the event, and arrangements for separation, collection and diversion from landfills of

reusable, recyclable, and compostable materials. Within ten (10) calendar days after the conclusion of the event, the applicant shall submit to the Director of Environmental Services a copy of all weight or cubic yardage receipts for the Solid Waste and for the recyclables and Organic Materials from the receiving waste hauler, service charity, Recycling Center, or other such entity receiving the materials. Alternative documentation of diversion from the landfill may be acceptable if approved by the Director of Environmental Services at the time the strategy is filed with the Director.

B. All Large Venues, as defined in Part 2, shall prepare and adopt an annual waste prevention strategy to reduce the amount of waste material generated by facility operations, and shall file a copy of the strategy with the Director of Environmental Services on or before January 31 of each calendar year. The venue facility Owner or manager shall submit an annual report to the Director of Environmental Services that lists the weight or cubic yardage of Solid Waste, Organic Materials, and Recyclable Materials generated at the venue facility during the twelve (12) months from September 1 of a calendar year to August 31 of the next calendar year and the type, amount (by weight or cubic yardage), and destination of all Solid Waste disposed and each Recyclable Material sold or donated during that twelve (12) month period.

C. The Director of Environmental Services may exempt an event operator described in subsection A. or a venue facility Owner from some of the requirements of this Section if the Director determines that the event or venue facility does not generate significant amounts of Solid Waste or recyclables or because of localized market conditions for a particular Recyclable Material.

D. Large Events and Large Venues that qualify as commercial Edible Food Generators, as defined in Part 18, shall additionally comply with the Edible Food recovery requirements set forth in Part 18.

SECTION 71. Part 10 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

Part 10
SPECIAL PROVISIONS FOR CENTRAL BUSINESS DISTRICT AND TRANSIT MALL ZONE

9.10.1500 Central Business District - Described - Collection Hours and Procedures

A. Notwithstanding any other provisions of this Chapter, the following regulations shall apply to the collection of Solid Waste and Commingled Recyclables in that area of the City designated as the "Central Business District," the boundaries of which are described as follows: Commencing at Market and Julian Streets; east on Julian to Fourth Street; then south on Fourth Street to San Salvador; west on San Salvador to South Market Street; then northwest on Market Street to San Carlos Street; west on San Carlos to Almaden Boulevard; north on Almaden Boulevard to Santa Clara Street; east on Santa Clara Street to Market Street; then north on Market Street to West Julian Street, the point of beginning.

B. Unless expressly exempted therefrom by the Director, all occupants of Premises within the Central Business District (excepting occupants of hotel rooms and persons to whom Solid Waste or recyclables collection services are provided by and at the expense of another) shall subscribe to Solid Waste collection service from a Solid Waste Collector authorized to provide Solid Waste, Organic Materials, and recyclables collection services under the provisions of this Chapter. Such subscription shall be for service on at least a weekly basis, or more often as required by the Director.

C. The Generator shall place all Solid Waste containers, all Organic Materials containers, and all Commingled Recyclables containers in an accessible location in a smooth, hard-surfaced area for collection only between the hours of 10:00 p.m. of the day immediately preceding collection and 6:00 a.m. of the day of collection.

D. Solid Waste, Organic Materials, and recyclables collection shall include both sides of the boundary streets described in this Section.

E. Collections shall take place not earlier than 12:01 a.m. and shall be completed by 6:00 a.m. on the same day except as follows:

1. The Director may grant an exception to these collection limitations if the Solid Waste Collector demonstrates to the satisfaction of the Director that such exception will not impede the flow of traffic in the Central Business District and will not in any way interfere with or hinder either the normal operation or maintenance of the Central Business District or the services provided in said district.

2. The Director may impose restrictions on the hours of collection in addition to the restrictions set forth in this subsection E. if the Director determines that additional time limitations are needed to mitigate an impediment to traffic flow, an interference with the normal operation or maintenance of the Central Business District, or an interference with the quiet enjoyment of adjacent Residential Premises.

F. Following collection, the collector shall place emptied Solid Waste containers, Organic Materials containers, and Commingled Recyclables containers back on the curb in a neat and orderly manner with their lids firmly replaced.

G. The Generator shall remove all emptied Solid Waste containers, Organic Materials containers, and Commingled Recyclables containers from the curb, sidewalk or other public right-of-way not later than 9:00 a.m. on the same day that collection occurs, except where the Director has granted an exception to the collection time limitations pursuant to subsection E. above and such exception expressly permits removal after 9:00 a.m.

H. All Solid Waste, Organic Materials, and Commingled Recyclables containers shall be one (1) of the following:

1. A standard thirty-two (32)-gallon Solid Waste can with a tight-fitting lid which together with its contents does not exceed a weight of sixty (60) pounds.

2. A standard metal storage/collection bin with a metal cover or a plastic cover approved by the Director, provided by the Solid Waste Collector and which together with its contents does not exceed a weight of two (2) pounds per gallon of container capacity.

3. A wheeled collection cart with a tight-fitting lid which is provided by the Solid Waste Collector, is designed for use by semiautomatic or automatic collection equipment and which together with its contents does not exceed a weight of two (2) pounds per gallon of capacity.

4. If approved for uncontainerized collection, a plastic collection bag, of a type approved by the Director, with wire-tie closure which together with its contents does not exceed a weight of sixty (60) pounds.

9.10.1510 Establishment of Transit Mall Zone

A. There is hereby established the "Transit Mall Zone," the boundaries of which are as follows: Commencing at Market and Julian Streets; east on Julian Street to Third Street, then south on Third Street to San Carlos Street; then west on San Carlos Street to Market Street; then north on Market Street to Julian Street, the point of beginning; but excluding any Premises which face Julian, Third, San Carlos or Market Streets.

B. The regulations set forth in Section 9.10.1500 shall apply to the collection of Solid Waste, Organic Materials, and Commingled Recyclables from all Premises located in the Transit Mall Zone which have rear access for Solid Waste, Organic Materials, or recyclables collection and where all Solid Waste, Organic Materials, and/or recyclables are collected from the rear access location.

C. In addition to the regulations set forth in Section 9.10.1500, the regulations contained in Section 9.10.1520 shall apply to the collection of Solid Waste, Organic Materials, and Commingled Recyclables from all Premises located in the Transit Mall Zone which do not have rear access for Solid Waste collection or where Solid Waste, Organic Materials, or Commingled Recyclables collection is from a location other than the rear access location.

9.10.1520 Solid Waste Collection Regulations for Transit Mall Zone

A. No person shall keep or maintain any Solid Waste, Solid Waste container, Organic Materials container, Commingled Recyclables, or Commingled Recyclables container at, nor shall any person collect Solid Waste, Organic Materials, or Commingled Recyclables from, any Premises located in the Transit Mall Zone established by Section 9.10.1510 and described in Section 9.10.1510.C. except in conformance with the regulations set forth in this Section.

B. All Solid Waste, Organic Materials, and Commingled Recyclables containers shall be standard metal or plastic containers approved by the Director, equipped with plastic or rubber wheels and tight-fitting lids, and designed for use by semiautomatic or automatic collection equipment.

C. No Solid Waste shall be placed outside any Premises in any container other than the standard containers described in subsection B. unless the Solid Waste Generator has applied to the Director for an exemption to the requirements of subsection B. and the Director grants such exemption after finding all of the following:

1. No Garbage is produced on the Premises; and

2. Space for Solid Waste storage inside or behind the Premises is so limited as to preclude the storage of the standard container described in subsection B.; and

3. The Generator will use only disposal bags of sufficient quality and specification.

D. All Solid Waste containers described in subsection B., all Organic Materials containers, and all Commingled Recyclables containers shall be clearly marked by the Generator or the collector to show the name and address of the Generator or shall be clearly identified by such other means as is approved by the Director. All containers shall comply with the labeling and color requirements of Section 9.10.1420.

E. All Solid Waste containers, all Organic Materials containers, and all Commingled Recyclables containers shall be kept and maintained in conformance with

Section 9.10.1500, except that the gross weight for any container described in subsection B. of this Section shall not exceed two (2) pounds for each one (1) gallon of container volume.

F. Solid Waste, Organic Materials, and Commingled Recyclables collections shall take place no earlier than 12:01 a.m. and shall be completed by 6:00 a.m. the same day except as follows:

1. The Director may grant an exception to these collection limitations if the Solid Waste, Organic Materials, or Commingled Recyclables collector demonstrates to the satisfaction of the Director that such exception will not impede the flow of traffic in the Transit Mall Zone and will not in any way interfere with or hinder either the normal operation or maintenance of the Transit Mall Zone or the services provided in said Zone.

2. The Director may impose restrictions on the hours of collection in addition to the restrictions set forth in this subsection F. if the Director determines that additional time limitations are needed to mitigate an impediment to traffic flow, an interference with the normal operation or maintenance of the Transit Mall Zone, or an interference with the quiet or enjoyment of adjacent Residential Premises.

G. All Solid Waste containers, Organic Materials containers, and Commingled Recyclables containers, including disposal bags, if allowed pursuant to subsection C., shall be kept or stored within or behind the Generator's Premises at all times except that containers may be set out for collection between the hours of 10:00 p.m. of the day immediately preceding to collection and 6:00 a.m. of the day of collection. Containers shall be permitted to remain in the set-out location after 6:00 a.m. only in the case where the Director has granted an

exception to the collection time limitations pursuant to subsection F. above and such exception expressly permits removal of containers after 6:00 a.m.

H. All Solid Waste containers, Organic Materials containers, and Commingled Recyclables containers set out for collection, including disposal bags, if allowed pursuant to subsection C., shall be placed at or behind the building line of the Premises or in a recessed doorway of the Premises. Containers placed in recessed doorways shall not be placed in any manner that would hinder ingress or egress of emergency services personnel or, during business hours, members of the public.

I. If any provision of this Section conflicts with a provision of Section 9.10.1500, the provision contained in this Section shall prevail.

SECTION 72. The title of Part 11 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

Part 11
COMMERCIAL SOLID WASTE, ORGANIC MATERIALS, AND RECYCLABLES COLLECTION FRANCHISES

SECTION 73. Section 9.10.1600 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1600 Purpose and Declarations

A. It is hereby declared and determined that the business of collecting and transporting of Commercial Solid Waste, Organic Materials, and Recyclable Materials generated, kept or accumulated in the City, or of disposing of such Commercial Solid Waste, Organic Materials, and Recyclable Materials, is in the

nature of a public service and should be regulated by the City. The use of any public street or public property in connection with such business is of great concern to the City and should be regulated by the City. Therefore, it is the purpose of this Part to provide such regulation.

B. Pursuant to the provisions of Article XIII of the City Charter, the City hereby elects to have the grant of franchises governed by this Part, and any ordinances amendatory thereof, together with the applicable provisions of the City Charter, and these provisions shall constitute the exclusive procedure applicable to the granting of franchises for the conduct of the business of collecting, transporting or disposing of Commercial Solid Waste, Organic Materials, or Recyclable Material.

SECTION 74. Section 9.10.1610 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1610 Activities Which Are Unlawful Unless Authorized

No person shall engage in the business of collecting, transporting or disposing of Commercial Solid Waste, Organic Materials, or Recyclable Material kept, accumulated or generated in the City unless:

A. A franchise therefore has first been granted pursuant to the provisions of this Part and such franchise is in full force and effect; and

B. A written franchise agreement therefore has been executed between such person and the City and such agreement is in full force and effect.

SECTION 75. Section 9.10.1620 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1620 Franchise - Council Authority to Grant

The Council may and is hereby empowered to grant by ordinance to any person, whether operating under an existing franchise or not, a franchise to engage in the business of collecting, transporting, or disposing of Commercial Solid Waste, Organic Materials, or Recyclable Material kept, accumulated or generated in the City.

SECTION 76. Section 9.10.1635 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1635 Franchise Categories

The City Council may, in its sole discretion, grant a Commercial Solid Waste and Recyclable Material collection franchise which is limited to the collection of Solid Wastes, Organic Materials, or Recyclable Material in categories determined by the City Council and described in the ordinance granting the franchise or in the franchise agreement.

SECTION 77. Section 9.10.1640 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1640 Application for Franchise

A. All applications for franchises pursuant to this Part shall be in writing and shall be filed with the Director.

B. Each application for a franchise shall be on a form provided by the Director, shall include all attachments required by the Director, and shall contain the following information:

1. The name and address of the applicant. If the applicant is a partnership, the name and address of each partner shall be set forth in the application. If the applicant is a corporation, the application shall state the names and addresses of the corporation's directors, main offices, major stockholders and associates, and the names and addresses of the parent and subsidiary companies.

2. The names of the executive, operational and financial managers to be used in connection with the Solid Waste and recyclables collection services, together with documentation that such persons and the applicant have sufficient experience in Solid Waste Handling to perform Solid Waste, Organic Materials, and recyclables collection services in the City.

3. A list of all vehicles, including license plate numbers and vehicle identification numbers, to be used in connection with the franchise for which the application is filed.

4. Proof satisfactory to the Director that the applicant has adequate financial resources to conduct the Commercial Solid Waste collection services.

5. Such additional information as may be reasonably requested by the Director.

C. The application shall be signed by the person applying for the Solid Waste, Organic Materials, and recyclables collection franchise or by a person authorized to bind the applicant.

SECTION 78. A new section is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

9.10.1685 Other Commercial Franchise Requirements

A. Franchise grantees providing Recyclable Materials, Organic Materials, or Solid Waste collection services to Generators within the City's boundaries shall meet the following requirements and standards with the City to collect Recyclable Materials, Organic Materials, or Solid Waste:

1. Through written notice to the Director annually, identify the facilities to which they will transport discarded materials, including facilities for Source Separated Recyclable Materials, Source Separated Organic Materials, Garbage, and other Solid Waste unless otherwise stated in the franchise agreement or other authorization with the City.

2. Transport Source Separated Recyclable Materials to a facility that recovers those materials; transport Source Separated Organic Materials to a facility, operation, activity, or property that recovers Organic Material as defined in 14 CCR, Division 7, Chapter 12, Article 2; transport Mixed Waste, if applicable, to a facility that qualifies as a High Diversion Organic Waste Processing Facility; transport Solid Waste to a disposal facility or transfer facility or operation that processes or disposes of Solid Waste; and, transport manure, if applicable, to a facility that manages manure in conformance with 14 CCR Article 12 and such that the manure is not landfilled, used as alternative daily cover, or used as alternative intermediate cover.

3. Obtain approval from the City to haul Organic Material, unless it is transporting Source Separated Organic Material to a Community

Composting site or lawfully transporting Construction and Demolition Debris in a manner that complies with 14 CCR Section 18989.1 and the City's municipal code.

B. Collectors authorized to collect Recyclable Materials, Organic Materials, or Solid Waste shall comply with the education, equipment, signage, container labeling, container color, contamination monitoring, reporting, and other requirements set forth in this Chapter, its franchise agreement with the City, and applicable law.

SECTION 79. Section 9.10.1690 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1690 Termination or Suspension of Franchise

A. The City Council shall have the right to terminate any franchise granted pursuant to this Part if the council finds, after a public hearing following not less than fourteen (14) days written notice to the franchise grantee, that:

1. The grantee has failed to comply with, or to do anything required of the grantee by, applicable provisions of the City Charter, provisions of this Chapter 9.10, provisions of the ordinance granting the franchise, or provisions of the franchise agreement; or

2. Any provision of this Part becomes or is declared to be invalid and the Council expressly finds that such provision constitutes a material consideration to the grant or continuation of such franchise.

B. Any franchise granted pursuant to this Part shall automatically be suspended whenever the grantee:

1. Fails to keep in full force and effect the bonds and insurance required by the franchise agreement; or

2. Fails to keep in full force and effect any applicable licenses or permits required by federal, state or local law.

The suspension of the franchise pursuant to this subsection B. shall remain in effect until the grantee provides documentation satisfactory to the Director, demonstrating that the reason for the suspension specified above no longer exists.

C. The Director may suspend any franchise granted under this Part if the grantee:

1. Fails to submit timely reports as described in Section 9.10.1720 within fifteen (15) days after written notice from the Director that a report is delinquent; or

2. Fails to comply with the reporting requirements of subsection A. of Section 9.10.1720 and fails to correct the deficiencies in the report within fifteen (15) days after written notice from the Director of the deficiencies.

The suspension of the franchise pursuant to this subsection C. shall remain in effect for the period specified in the Director's notice unless the suspension is reversed or modified by the Director or, upon appeal by the grantee, by the City Council.

D. In the event the franchise granted pursuant to this Part is terminated, the grantee shall have no right or authority to engage in Commercial Solid Waste or Recyclable Material collection, transportation or disposal operations in the City unless and until a subsequent Commercial Solid Waste and Recyclable Material

collection franchise is granted to the grantee. Nothing herein shall require the City to grant any subsequent franchise to the grantee.

E. In the event the franchise granted pursuant to this Part is suspended, the grantee shall have no right or authority to engage in Commercial Solid Waste or Recyclable Material collection, transportation or disposal operations in the City during the period of suspension.

F. In the event any franchise granted pursuant to this Part is terminated under subsection A. above, then within the time period specified by the City Council, the grantee shall:

1. Remove all of the grantee's, and any subcontractor's, Solid Waste containers, Organic Materials containers, and Recyclable Material containers from all service locations where services have been provided pursuant to such franchise; and

2. Properly collect, transport, and process or dispose of any and all Solid Wastes, Organic Materials, and recyclables in the containers at the time of removal, in accordance with this Chapter.

G. If the grantee fails to remove any Solid Waste, Organic Materials, and Recyclable Material container or to properly dispose of any Solid Waste, Organic Materials, or Recyclable Material in any container within the time specified by the City Council pursuant to subsection A. above, the City may remove the container and/or dispose of the Solid Waste, Organic Materials, or Recyclable Material therein and may charge the grantee for the City's costs. The grantee shall pay to the City all of the costs incurred by the City in such removal and/or disposal within ten (10) days of the date of the City's invoice for such costs.

SECTION 80. Section 9.10.1695 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1695 Maximum Commercial Solid Waste, Organic Materials, and Recyclable Material Collection Service Rate

A. The Commercial Solid Waste, Organic Materials, and Recyclable Material franchisee with a franchise based on geographic service district may apply for an adjustment to the maximum Commercial Solid Waste, Organic Materials, and Recyclable Material collection service rate. Any request to adjust the existing maximum service rate shall be in accordance with the application process, methodology, and other factors specified in the franchise agreement.

B. The City Council may conduct a public hearing to confirm that the proposed maximum Commercial Solid Waste, Organic Materials, and Recyclable Material collection service rates are consistent with the terms of the franchise agreement.

C. Franchisee shall provide all customers with advance written notice of changes to the maximum Commercial Solid Waste, Organic Materials, and Recyclable Material collection service rates at least thirty (30) calendar days prior to the effective date of the change.

SECTION 81. Section 9.10.1710 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1710 Franchise Fees

A. Each person engaging in the business of collecting, transporting or disposing of Commercial Solid Waste, Organic Materials, or Recyclable Material kept, accumulated or generated in the City shall pay a franchise fee to the City. The

franchise fee shall be in an amount as set forth in a resolution adopted by the City Council.

B. Franchise fees shall be payable on a monthly basis, and shall be due and payable on the last day of the month immediately following the month in which collection services were provided. Each payment shall be calculated in accordance with the provisions of the resolution adopted by the City Council pursuant to subsection A. above.

C. The required franchise fee shall be paid to the City's Director of Finance. Each payment shall be accompanied by a written statement, verified by the person making the payment, or a duly authorized representative of the person, showing the calculation of the franchise fee payable in such form and detail as the Director of Finance may require and such other information as the Director of Finance may determine is material to a determination of the amount due.

D. No statement filed under this Section shall be conclusive as to the matters set forth in such statement, nor shall the filing of such statement preclude the City from collecting by appropriate action the sum that is actually due and payable.

E. The payment of franchise fees to the City pursuant to this Part shall be in addition to any license fee or business tax prescribed by the City for the same period.

F. If franchise fees are not paid by the grantee at the times required by this Section 9.10.1710, then in addition to the franchise fees, the grantee shall pay a late payment charge in an amount equal to ten percent (10%) of the franchise fee that was not timely paid. If the grantee fails to pay delinquent franchise fees within thirty (30) days of the date required by this Section 9.10.1710, the grantee shall pay a second late payment charge in an amount equal to ten percent (10%)

of the franchise fee outstanding after such thirty (30)-day period. Such second late payment charge shall be in addition to the first late payment charge. In addition, the grantee shall pay interest on all unpaid franchise fees at the rate of ten percent (10%) per annum or the legal rate allowed, whichever is less, from the date said franchise fees were due and payable to the date actually paid.

SECTION 82. Section 9.10.1720 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1720 Reports

A. The grantee shall report to the Director the following information:

1. The grantee shall file with the Director a monthly report of the quantities of Commercial Solid Waste, Commingled Recyclables and Source Separated recyclables collected, transported and/or disposed of during the month, the number of San José customers served by the grantee during the month, and the container size(s) and frequency of collection performed for each customer, and the grantee's gross receipts for collection services provided in San José during the month. Such report shall be in such form and detail as required by the Director and, if required by the Director, shall include a report of the quantities of Commercial Solid Waste recycled and the quantities disposed of at disposal facilities.

2. Through written notice to the City annually, the grantee shall identify the facilities to which it will transport materials, including facilities for Recyclable Materials, Organic Materials, Mixed Waste, or other Solid Waste as applicable to the grantee’s services, unless otherwise stated in the franchise agreement or other authorization with the City.

B. If any of the reports required under subsection A. are not filed by the due date specified in the franchise agreement, the report shall be deemed delinquent.

C. If the report is delinquent, the grantee shall pay to the City a delinquent report charge in the amount of three hundred dollars ($300.00). If the report remains delinquent for more than fifteen (15) days, the grantee shall pay to the City an additional delinquent report charge in the amount of three hundred dollars ($300.00). If the report remains delinquent for more than thirty (30) days, the grantee shall pay to the City a third delinquent report charge in the amount of three hundred dollars ($300.00). If the report remains delinquent for more than forty-five (45) days, the grantee shall pay to the City a fourth delinquent report charge in the amount of three hundred dollars ($300.00). Such delinquent report charges shall be in addition to any franchise fees or other charges payable by the grantee for the same period of time.

SECTION 83. Section 9.10.1740 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1740 City Inspection Authority

The grantee shall at all times maintain accurate and complete accounts of all revenues and income arising out of its operations under the franchise granted pursuant to this Part; all Solid Waste collected, transported and/or disposed of; the source of such Solid Waste; and the final destination of such Solid Waste. Grantee's books, accounts and records shall at all times be open to inspection, examination and audit by authorized officers, employees and agents of the City. Grantee shall comply with the recordkeeping and inspection requirements of Section 9.10.590.

SECTION 84. Section 9.10.1810 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.1810 Combined Waste Streams

A. A Mixed Use Development may commingle the Residential Solid Waste and Commercial Solid Waste generated at the Mixed Use Development; provided that Organic Materials and Recyclable Materials are properly separated and prepared for collection in accordance with the City's collection programs.

B. The commingled waste shall be collected by the City's authorized Multi-Family Dwelling Solid Waste Collector if the total square footage of commercial building space in the Mixed Use Development is less than fifteen percent (15%) of the total building space.

C. The commingled waste shall be collected by a person authorized to perform Commercial Solid Waste collection services pursuant to a franchise granted pursuant to Part 11 of this Chapter if the total square footage of commercial building space in the Mixed Use Development is fifteen percent (15%) or more of the total building space.

D. Notwithstanding subsections B. and C. above, a Mixed Use Development with twenty percent (20%) or less of the total square footage as commercial building space as of June 30, 2012 may continue to receive service from the Multi-Family Dwelling Solid Waste Collector.

E. Notwithstanding this Section, the Director reserves the right to require the Mixed Use Development to cause the collection of commingled Solid Waste be collected as Residential Solid Waste or as Commercial Solid Waste shall be

based upon the needs of the Mixed Use Development and the effect of the Solid Waste collection service type on the neighboring areas.

SECTION 85. Section 9.10.2240 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.2240 Feeding Swill to Animals - Conditions

A. No Solid Waste shall be fed to any animals or livestock in the City unless written permission is first procured from the Director to feed Swill generated within any Premises in the City to animals or livestock lawfully maintained and kept within the Premises where the Swill is generated.

B. The Director may grant permission, subject to such conditions and restrictions as the Director may find necessary to protect the public health and safety, only if the Director finds the proposed place and manner of disposal will not endanger the public health and safety. Any such permission is revocable at any time by the Director or City Council.

C. Notwithstanding this Section, Organic Material may be diverted from landfill disposal through lawful use as animal feed, as set forth in Chapter 6 of Food and Agricultural Code (FAC), commencing with Section 14901 et. seq and Title 3, Division 4, Chapter 2, Subchapter 2 commencing with Article 1, Section 2675 of the Code of California Regulations.

SECTION 86. Section 9.10.2480 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.2480 California Green Building Standards Code Compliance

Persons applying for a permit from the City for new construction and building additions and alterations shall comply with the requirements of this Part and all required components of the California Green Building Standards Code, 24 CCR, Part 11 (CALGreen), as amended, if its project is covered by the scope of CALGreen and other applicable requirements of the City. If the requirements of CALGreen, as amended, are more stringent than the requirements of this Part, the CALGreen requirements shall apply.

Notwithstanding any other provision to the contrary, a building permit applicant that documents the completion of a construction waste management plan in accordance with CALGreen at the following diversion levels shall be deemed in compliance with the provisions of this Part:

A. For building permit applications filed between January 1, 2011 and December 31, 2011, at a sixty percent (60%) diversion level as determined by the Director.

B. For building permit applications filed between January 1, 2012 and December 31, 2012, at a sixty-five percent (65%) diversion level as determined by the Director.

C. For building permit applications filed on or after January 1, 2013, at a seventy-five percent (75%) diversion level as determined by the Director.

SECTION 87. Section 9.10.3015 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.3015 Mandatory Solid Waste Requirements

Notwithstanding any other provision of this Chapter, the Director, or the Director's designee, may require the Owner of a residential or Commercial Premises or the Generator of Solid Waste at such Premises to subscribe to and pay for Solid Waste collection services in such configuration as the Director determines is necessary for the preservation of the public health and/or public safety. Such requirements may include, but are not limited to, requiring Solid Waste containers in such sizes and numbers as needed to store all the Solid Waste generated at the Premises during the periods between collections, requiring the Owner or Generator to change the frequency of Solid Waste collections at the Premises, and requiring a change from residential to commercial collection service or from commercial to residential collection service.

SECTION 88. Section 9.10.3020 of Chapter 9.10 of Title 9 of the San José Municipal Code is amended to read as follows:

9.10.3020 Emergencies and Waivers

A. During any period of time for which the President of the United States, the Governor of the state of California or the Mayor of the City of San José has declared a state of emergency exists in the City of San José or any part thereof, the Director, in consultation with the Health Officer, may suspend any Solid Waste Handling requirements of this Chapter and may promulgate such alternative Solid Waste Handling requirements as the Director deems necessary for the protection and preservation of the health, safety and general welfare of the people of the City of San José.

B. The Director, in their sole discretion and in accordance with applicable law, may offer waivers, such as waivers permissible by 14 CCR Section 18984.11 or otherwise described in this Chapter, or other exemptions that may be granted to Generators on the basis of demonstrated extenuating circumstances for some of the requirements of this Chapter. Qualified and interested persons may apply for or be granted such waivers, in accordance with the administrative processes prescribed by the Director or their designee, and shall pay all relevant administrative fee(s), if enacted, in the amount specified in the schedule of fees adopted by resolution of the City Council for the City's administration of the waiver process.

C. In determining whether to grant the waiver or exemption, the Director shall evaluate all relevant factors including, but not limited to: type of Generator; physical space constraints; volume of discarded materials generated; collection frequency needs; occupancy or development of the Premises; demonstrated extenuating circumstances by the applicant; and other factors related to exemptions that may be available under applicable law, as amended. The Director may, in their sole discretion, add or remove factors considered in the criteria for waivers and exemptions granted under this Section.

D. Any person granted a waiver by the City shall follow all terms and conditions incorporated as part of the waiver, or otherwise prescribed by the Director or their designee, regardless of whether or not those terms have been specified in this Chapter or other sections of the City's municipal code. The City reserves the right to conduct inspections to verify compliance with the conditions of any waiver or exemption, or application therefore, both prior to granting of such waiver or exemption, and at subsequent times thereafter as determined appropriate by the Director.

SECTION 89. A new part is added to Chapter 9.10 of Title 9 of the San José Municipal Code, to be numbered, entitled and to read as follows:

Part 18
EDIBLE FOOD RECOVERY

9.10.3200 Findings and Purpose

A. Pursuant to SB 1383, the Short-lived Climate Pollutant Reduction Act of 2016, CalRecycle developed regulations to reduce organics in landfills as a source of methane. The regulations place new requirements on cities, counties, residential households, businesses, waste haulers, and Food Recovery Organizations to support achievement of statewide Organic Material disposal reduction targets.

B. CalRecycle's regulations direct cities and counties to develop Edible Food Recovery programs and require that certain businesses to arrange for the donation of Edible Food that would otherwise go to waste. In addition to targeting methane emissions, these new programs and requirements will help reduce food insecurity in California.

C. Pursuant to 14 CCR Section 18981.2, jurisdictions may delegate certain responsibilities for implementing, monitoring, and enforcing their Edible Food Recovery programs to public or private entities.

D. The City Manager is authorized to enter into an agreement on behalf of the City with another entity, as permitted under 14 CCR Section 18981.2, for the inspection and enforcement of this Part.

9.10.3210 Definitions

The definitions set forth in this Section shall govern the application and interpretation of this Part.

A. "Department" means any department of the City or department of the entity designated by the City to enforce or administer this Part, as authorized in 14 CCR Section 18981.2.

B. "Designee" means any private entity that the City or City designated agency contracts with or otherwise arranges to carry out any responsibilities of this Part, as authorized in 14 CCR Section 18981.2.

C. "Edible Food" means food intended for human consumption, or as otherwise defined in 14 CCR Section 18982(a)(18). For the purposes of this Part, "Edible Food" is not Solid Waste if it is recovered and not discarded. Nothing in this Part requires or authorizes the recovery of Edible Food that does not meet the food safety requirements of the California Retail Food Code.

D. "Food Distributor" means a company that distributes food to entities including, but not limited to, Supermarkets and Grocery Stores, or as otherwise defined in 14 CCR Section 18982(a)(22).

E. "Food Facility" has the same meaning as in Section 113789 of the Health and Safety Code.

F. "Food Recovery" means actions to collect and distribute food for human consumption which otherwise would be disposed, or as otherwise defined in 14 CCR Section 18982(a)(24).

G. "Food Recovery Organization" means an entity that engages in the collection or receipt of Edible Food from commercial Edible Food Generators and distributes that Edible Food to the public for Food Recovery either directly or through other entities. "Food Recovery Organization" includes, but is not limited to:

1. A food bank as defined in Section 113783 of the Health and Safety Code;

2. A nonprofit charitable organization as defined in Section 113841 of the Health and Safety Code; and

3. A nonprofit charitable temporary Food Facility as defined in Section 113842 of the Health and Safety Code.

A Food Recovery Organization is not a Commercial Edible Food Generator for the purposes of this Part pursuant to 14 CCR Section 18982(a)(7).

If the definition in 14 CCR Section 18982(a)(25) for Food Recovery Organization differs from this definition, the definition in 14 CCR Section 18982(a)(25) shall apply to this Part.

H. "Food Recovery Service" means a person or entity that collects and transports Edible Food from a commercial Edible Food Generator to a Food Recovery Organization or other entities for Food Recovery, or as otherwise defined in 14 CCR Section 18982(a)(26). A Food Recovery Service is not a Commercial Edible Food Generator.

I. "Food Service Provider" means an entity primarily engaged in providing food services to institutional, governmental, commercial, or industrial locations of others based on contractual arrangements with these types of organizations, or as otherwise defined in 14 CCR Section 18982(a)(27).

J. “Grocery Store” means a store primarily engaged in the retail sale of canned food; dry goods; fresh fruits and vegetables; fresh meats, fish, and poultry; and any area that is not separately owned within the store where the food is prepared and served, including a bakery, deli, and meat and seafood departments, or as otherwise defined in 14 CCR Section 18982(a)(30).

K. “Health Facility” has the same meaning as in Section 1250 of the Health and Safety Code.

L. “Hotel” has the same meaning as in Section 17210 of the Business and Professions Code.

M. “Inspection” means a Department or Designee’s electronic or onsite review of reviews records, containers, and an entity’s collection, Handling, Recycling, or landfill disposal of Organic Material or Edible Food Handling to determine if the entity is complying with requirements set forth in this Part, or as otherwise defined in 14 CCR Section 18982(a)(35).

N. “Large Event” means an event, including, but not limited to, a sporting event or a flea market, that charges an admission price, or is operated by a local agency, and serves an average of more than two thousand (2,000) individuals per day of operation of the event, at a location that includes, but is not limited to, a public, nonprofit, or privately owned park, parking lot, golf course, street system, or other open space when being used for an event. If the definition in 14 CCR Section 18982(a)(38) differs from this definition, the definition in 14 CCR Section 18982(a)(38) shall apply to this Part.

O. “Large Venue” means a permanent venue facility that annually seats or serves an average of more than 2,000 individuals within the grounds of the facility per

day of operation of the venue facility. A venue facility includes, but is not limited to, a public, non-profit, or privately owned or operated stadium, amphitheater, arena, hall, amusement park, conference or civic center, zoo, aquarium, airport, racetrack, horse track, performing arts center, fairground, museum, theater, or other public attraction facility. A site under common ownership or control that includes more than one Large Venue that is contiguous with other Large Venues in the site, is a single Large Venue. If the definition in 14 CCR Section 18982(a)(39) differs from this definition, the definition in 14 CCR Section 18982(a)(39) shall apply to this Part.

P. "Local Education Agency" means a school district, charter school, or county office of education that is not subject to the control of city or county regulations related to Solid Waste, or as otherwise defined in 14 CCR Section 18982(a)(40).

Q. "Non-Local Entity" means an entity that is an Organic Material Generator but is not subject to the control of a jurisdiction's regulations related to Solid Waste. These entities may include, but are not limited to, special districts, federal facilities, prisons, facilities operated by the state parks system, public universities, including community colleges, county fairgrounds, and state agencies.

R. "Restaurant" means an establishment primarily engaged in the retail sale of food and drinks for on-Premises or immediate consumption, or as otherwise defined in 14 CCR Section 18982(a)(64).

S. "Share Table" has the same meaning as in Section 114079 of the Health and Safety Code.

T. "Supermarket" means a full-line, self-service retail store with gross annual sales of two million dollars ($2,000,000), or more, and which sells a line of dry grocery,

canned goods, or nonfood items and some perishable items, or as otherwise defined in 14 CCR Section 18982(a)(71).

U. "Tier One Commercial Edible Food Generator" means the following:

1. Supermarkets.

2. Grocery Stores with a total facility size equal to or greater than 10,000 square feet.

3. Food Service Providers.

4. Food Distributors.

5. Wholesale Food Vendors.

If the definition in 14 CCR Section 18982(a)(73) of Tier One Commercial Edible Food Generator differs from this definition, the definition in 14 CCR Section 18982(a)(73) shall apply to this Part.

For the purposes of this Part, Food Recovery Organizations and Food Recovery Services are not commercial Edible Food Generators.

V. "Tier Two Commercial Edible Food Generator" means the following:

1. Restaurants with two hundred fifty (250) or more seats or a total facility size equal to or greater than five thousand (5,000) square feet.

2. Hotels with an on-site Food Facility and two hundred (200) or more rooms.

3. Health Facilities with an on-site Food Facility and one hundred (100) or more beds.

4. Large Venues.

5. Large Events.

If the definition in 14 CCR Section 18982(a)(74) of Tier Two Commercial Edible Food Generator differs from this definition, the definition in 14 CCR Section 18982(a)(74) shall apply to this Part. Non-Local Entities that operate a facility that meets this definition are Tier Two Commercial Edible Food Generators.

For the purposes of this Part, Food Recovery Organizations and Food Recovery Services are not commercial Edible Food Generators.

W. "Wholesale Food Vendor" means a business or establishment engaged in the merchant wholesale distribution of food, where food (including fruits and vegetables) is received, shipped, stored, prepared for distribution to a retailer, warehouse, distributor, or other destination, or as otherwise defined in 14 CCR Section 189852(a)(76).

9.10.3220 Requirements for Commercial Edible Food Generators

A. Tier One Commercial Edible Food Generators must comply with the requirements of this Section commencing January 1, 2022, and Tier Two Commercial Edible Food Generators must comply commencing January 1, 2024, pursuant to 14 CCR Section 18991.3.

B. Large Venue or Large Event operators not providing food services, but allowing for food to be provided by others, shall require Food Facilities operating at the

Large Venue or Large Event to comply with the requirements of this Section, commencing January 1, 2024.

C. Tier One and Tier Two Commercial Edible Food Generators shall comply with the following requirements:

1. Arrange to recover the maximum amount of Edible Food that would otherwise be disposed.

2. Contract with, or enter into a written agreement with, Food Recovery Organizations or Food Recovery Services for: (i) the collection of Edible Food for Food Recovery; or (ii) acceptance of the Edible Food that the Commercial Edible Food Generator self-hauls to the Food Recovery Organization for Food Recovery.

3. Shall not intentionally spoil Edible Food that is capable of being recovered by a Food Recovery Organization or a Food Recovery Service.

4. Allow the Department or Designee to access the Premises, conduct Inspections, and review electronic and hard copy records pursuant to 14 CCR Section 18991.4.

5. Keep records that include the following information, or as otherwise specified in 14 CCR Section 18991.4:

   a. A list of each Food Recovery Service or Organization that collects or receives its Edible Food pursuant to a contract or written agreement established under 14 CCR Section 18991.3(b).

b. A copy of all contracts or written agreements established under 14 CCR Section 18991.3(b).

c. A record of the following information for each of those Food Recovery Services or Food Recovery Organizations:

(i) The name, address and contact information of the Food Recovery Service or Food Recovery Organization.

(ii) The types of food that will be collected by or self-hauled to the Food Recovery Service or Food Recovery Organization.

(iii) The established frequency that food will be collected or self-hauled.

(iv) The quantity of food, measured in pounds recovered per month, collected or self-hauled to a Food Recovery Service or Food Recovery Organization for Food Recovery.

D. Tier One Commercial Edible Food Generators shall submit Food Recovery reports, as defined below, to the Department or Designee according to the following schedule:

1. On or before August 1, 2022, Tier One Commercial Edible Food Generators shall submit a Food Recovery report for the period of January 1, 2022 through June 30, 2022.

2. On or before May 1, 2023, and on or before May 1st each year thereafter, Tier One Commercial Edible Food Generators shall submit a Food Recovery report for the period covering the entire previous calendar year.

E. Tier Two Commercial Edible Food Generators shall submit Food Recovery reports, as defined below, to the Department or Designee according to the following schedule:

1. On or before May 1, 2025, and on or before May 1st each year thereafter, Tier Two Commercial Edible Food Generators shall submit a Food Recovery report for the period covering the entire previous calendar year.

F. Food Recovery Reports submitted by Tier One and Tier Two Commercial Edible Food Generators shall include the following information:

1. The name and address of the Commercial Edible Food Generator;

2. The name of the person responsible for the Commercial Edible Food Generator's Edible Food Recovery program;

3. A list of all contracted Food Recovery Services or Food Recovery Organizations that collect Edible Food from the Commercial Edible Food Generator; and

4. The total number of pounds of Edible Food, per year, donated through a contracted Food Recovery Organization or Food Recovery Service.

G. Nothing in this Part shall be construed to limit or conflict with the protections provided by the California Good Samaritan Food Donation Act of 2017, the Federal Good Samaritan Act, or Share Table and school food donation guidance pursuant to Senate Bill 557 of 2017 (approved by the Governor of the State of California on September 25, 2017, which added Article 13 [commencing with Section 49580] to Chapter 9 of Part 27 of Division 4 of Title 2 of the Education

Code, and to amend Section 114079 of the Health and Safety Code, relating to food safety, as amended, supplemented, superseded and replaced from time to time).

9.10.3230 Requirements for Food Recovery Organizations and Services

A. Food Recovery Services collecting, receiving, or coordinating the collection of Edible Food directly from Tier One or Tier Two Commercial Edible Food Generators, via a contract or written agreement established under 14 CCR Section 18991.3(b), shall maintain the following records, or as otherwise specified by 14 CCR Section 18991.5(a)(1):

1. The name, address, and contact information for each Commercial Edible Food Generator from which the service collects Edible Food.

2. The quantity in pounds of Edible Food collected from each Commercial Edible Food Generator per month.

3. The quantity in pounds of Edible Food transported to each Food Recovery Organization per month.

4. The name, address, and contact information for each Food Recovery Organization that the Food Recovery Service transports Edible Food to for Food Recovery.

B. Food Recovery Organizations collecting, receiving, or coordinating the collection of Edible Food directly from Tier One or Tier Two Commercial Edible Food Generators, via a contract or written agreement established under 14 CCR Section 18991.3(b), shall maintain the following records, or as otherwise specified by 14 CCR Section 18991.5(a)(2):

1. The name, address, and contact information for each Commercial Edible Food Generator from which the organization receives Edible Food.

2. The quantity in pounds of Edible Food received from each Commercial Edible Food Generator per month.

3. The name, address, and contact information for each Food Recovery Service that the organization receives Edible Food from for Food Recovery.

C. Food Recovery Organizations and Food Recovery Services that have their primary address physically located in the City and contract with or have written agreements with one or more Tier One or Tier Two Commercial Edible Food Generators pursuant to 14 CCR Section 18991.3(b) shall submit Food Recovery Reports, as defined below, to the Department or Designee according to the following schedule:

1. On or before August 1, 2022, Food Recovery Organizations and Food Recovery Services shall submit a Food Recovery Report for the period of January 1, 2022 through June 30, 2022; and

2. On or before May 1, 2023, and on or before May 1st each year thereafter, Food Recovery Organizations and Food Recovery Services shall submit a Food Recovery Report for the period covering the entire previous calendar year.

D. Food Recovery reports submitted by Food Recovery Services or Organizations shall include the following information:

1. Total pounds of Edible Food recovered in the previous calendar year from Tier One and Tier Two Edible Food Generators with whom the reporting entity has a contract or written agreement pursuant to 14 CCR Section 18991.3(b).

2. Total pounds of Edible Food recovered in the previous calendar year from Tier One and Tier Two Edible Food Generators within Santa Clara County with whom the reporting entity has a contract or written agreement pursuant to 14 CCR Section 18991.3(b).

E. In order to support Edible Food Recovery capacity planning assessments or other studies conducted by the County of Santa Clara, the City, or Designee(s), Food Recovery Services and Food Recovery Organizations operating in the City shall provide information and consultation to the City, Designee, or Department, upon request, regarding existing, or proposed new or expanded, Food Recovery capacity that could be accessed by the City and its Commercial Edible Food Generators. A Food Recovery Service or Food Recovery Organization contacted by the Department or its Designee shall respond to such request for information within sixty (60) days, unless a shorter timeframe is otherwise specified by the Department or Designee.

9.10.3240 Edible Food Recovery Inspections and Investigations by Department or Designee

A. The Department and/or Designee are authorized to conduct Inspections and investigations, at random or otherwise, of any collection container, collection vehicle loads, or transfer, Processing, or disposal facility for materials collected from Generators to confirm compliance with this Part by Tier One and Tier Two Commercial Edible Food Generators, Food Recovery Services, and Food Recovery Organizations, subject to applicable laws. This Section does not allow

the Department or Designee to enter the interior of a private residential property for Inspection.

B. Regulated entities shall provide or arrange for access during all Inspections (with the exception of residential property interiors) and shall cooperate with the Department's or Designee's employees during such Inspections and investigations. Such Inspections and investigations may include in-person or electronic review of Edible Food Recovery activities, records, or any other requirement of this Part described herein. Failure to provide or arrange for access to an entity's Premises or access to records for any Inspection or investigation is a violation of this Part and may result in penalties described.

C. Any records obtained by the Department or Designee during its Inspections, and other reviews shall be subject to the requirements and applicable disclosure exemptions of the Public Records Act as set forth in Government Code Section 6250 et seq.

D. Representatives of the Department and/or Designee are authorized to conduct any Inspections, or other investigations as reasonably necessary to further the goals of this Part, subject to applicable laws.

E. City will provide a procedure for the submission of written complaints, including anonymous complaints, regarding entities that may be in violation of this Part. Complaints shall include the name and contact information of the complainant, if the complainant is not anonymous; the identity of the alleged violator, if known; a description of the alleged violation including location(s) and all other relevant facts known to the complainant; any relevant photographic or documentary evidence to support the allegations in the complaint; and the identity of any witnesses, if known.

9.10.3250 Enforcement

A. Enforcement of this Part may be undertaken by the City or an entity designated by the City.

B. Administrative Fine. Violation of any provision of this Part shall constitute grounds for issuance of a Notice of Violation and assessment of an administrative fine by the Department. Absent compliance by the respondent within the deadline set forth in the Notice of Violation, the Department shall commence an action to impose penalties through an administrative citation and fine.

C. Notice of Violation. Before assessing an administrative citation and fine, the Department shall issue a Notice of Violation requiring compliance within sixty (60) days of issuance of the Notice. The Notice shall include: (1) the name(s) of each person or entity to whom it is directed, (2) a factual description of the violations, including the regulatory section(s) being violated, (3) a compliance date by which the respondent is to take specified action(s), and (4) the penalty for not complying before the specified deadline. For repeat and/or willful violations, the Department may require compliance within fewer than sixty (60) days or may immediately issue an administrative citation and fine.

D. Extensions to Compliance Deadlines. The Department may extend the compliance deadlines set forth in a Notice of Violation if it finds that there are extenuating circumstances beyond the control of the respondent that make compliance within the deadlines impracticable, including the following:

1. Acts of God such as earthquakes, wildfires, flooding, and other emergencies or natural disasters;

2. Delays in obtaining discretionary permits or other government agency approvals;

3. Deficiencies in Edible Food Recovery capacity and the existence of a corrective action plan imposed by CalRecycle pursuant to 14 CCR Section 18996.2 due to those deficiencies; or

4. Any other circumstance in which the Director, in their sole discretion, finds good cause to extend the compliance deadlines.

E. Administrative Citations. If the respondent fails to correct the violation by the compliance date or as otherwise provided in subsection B. above, the Department shall issue an administrative citation and fine.

1. If the administrative citation was issued by the City, it shall be issued in accordance with Chapter 1.15.

2. If the administrative citation was issued by an agency designated by the City, it shall be issued in accordance with the agency's regulations and procedures for issuing such citations and fines.

F. Amount of Fine. At the discretion of the Director of the Department, administrative fines for each violation of this Part may automatically accrue each day that the cited violation persists, including during the correction period (if any) specified in the Notice of Violation. If the respondent corrects the violation on or before the specified compliance date, they shall not be liable for any accrued fines for that violation. The Notice of Violation shall specify whether administrative fines will accrue daily. The amount of the administrative fine for each violation of this Part shall be as follows:

1. For a first violation, the amount of the base penalty shall be fifty dollars ($50) to one hundred dollars ($100) per violation and, if applicable, per day.

2. For a second violation, the amount of the base penalty shall be one hundred dollars ($100) to two hundred dollars ($200) per violation and, if applicable, per day.

3. For a third or subsequent violation, the amount of the base penalty shall be two hundred fifty dollars ($250) to five hundred dollars ($500) per violation and, if applicable, per day.

G. Factors Considered in Determining Penalty Amount. The following factors shall be used to determine the amount of the penalty for each violation within the appropriate penalty amount range:

1. The nature, circumstances, and severity of the violation(s).

2. The violator's ability to pay.

3. The willfulness of the violator's misconduct.

4. Whether the violator took measures to avoid or mitigate violations of this Part.

5. Evidence of any economic benefit resulting from the violation(s).

6. The deterrent effect of the penalty on the violator.

7. Whether the violation(s) were due to conditions outside the control of the violator.

H. Appeals. Persons receiving an administrative citation for an uncorrected violation may request a hearing to appeal the citation.

1. If the citation was issued by the City, the appeal shall be conducted in accordance with the appeal process in Chapter 1.15.

2. If the citation was issued by an agency, the appeal shall be conducted in accordance with the citing agency's regulations and procedures.

I. Other remedies. Other remedies allowed by law may be used to enforce this Part, including civil action or prosecution as misdemeanor or infraction. The Department and/or City may pursue civil actions in the California courts to seek recovery of unpaid administrative citations. The Department and/or City may choose to delay court action until such time as a sufficiently large number of violations, or cumulative size of violations exist such that court action is a reasonable use of Department staff and resources.

PASSED FOR PUBLICATION of title this 2ND day of NOVEMBER, 2021, by the following vote:

AYES:	ARENAS, CARRASCO, COHEN, DAVIS, FOLEY, JONES, JIMENEZ, MAHAN, PERALEZ, LICCARDO.
NOES:	NONE.
ABSENT:	ESPARZA.
DISQUALIFIED:	NONE.

SAM LICCARDO
Mayor

ATTEST:

TONI J. TABER, CMC
City Clerk

Appendix D

Plano, Texas, C&D Ordinance

ORDINANCE NO. 2008-9-35

AN ORDINANCE OF THE CITY OF PLANO, TEXAS REPEALING ORDINANCE NO. 2003-9-43 IN ITS ENTIRETY, CODIFIED AS ARTICLE I OF CHAPTER 18, SOLID WASTE, OF THE CODE OF ORDINANCES OF THE CITY OF PLANO; PROVIDING REVISED DEFINITIONS, REGULATIONS AND POLICIES FOR THE COLLECTION AND TRANSPORTATION OF SOLID WASTE, LANDSCAPE WASTE, HOUSEHOLD HAZARDOUS WASTE AND RECYCLABLE MATERIALS; ADDING A SECTION ESTABLISHING A DEPOSIT AND REBATE FEE STRUCTURE TO ENCOURAGE CONSTRUCTION AND DEMOLITION RECYCLING; ESTABLISHING FEES FOR CERTAIN HOUSEHOLD CHEMICAL COLLECTIONS; CHANGING THE NAME OF THE SOLID WASTE DIVISION TO THE SUSTAINABILITY & ENVIRONMENTAL SERVICES DEPARTMENT; PROVIDING A REPEALER CLAUSE, SEVERABILITY CLAUSE, SAVINGS CLAUSE, PENALTY CLAUSE, AND AN EFFECTIVE DATE.

WHEREAS, on September 22, 2003 the City Council of the City of Plano enacted Ordinance No. 2003-9-43, amending certain rules, regulations, and policies for the collection, handling and transportation of solid waste, landscape waste, and recyclable materials within the City of Plano; and

WHEREAS, certain definitions and processes set out in Article I, Chapter 18 of the Plano Code of Ordinances are in need of updating and modification; and

WHEREAS, the City Council of the City of Plano has determined that it would be appropriate to rename the Solid Waste Division to the *Sustainability & Environmental Services Department* to reflect the broader range of services being provided by this department; and

WHEREAS, the Environmental Waste Services Division will modify the current construction and demolition debris recycling program to benefit the citizens of Plano by adding a C&D deposit incentive component to the program; and

WHEREAS, the Environmental Waste Services Division will modify the Household Chemical Collection program to add an environmental fee to cover proper disposal of these items;

WHEREAS, the City Council hereby finds and determines that the following amendments to Article I, Chapter 18, Solid Waste, of the Plano Code of Ordinances are necessary and will benefit the public health, safety and welfare of the citizens of Plano.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF PLANO, TEXAS, THAT:

Section I. Ordinance No. 2003-9-43, duly passed and approved by the City Council of the City of Plano, Texas, on September 22, 2003 and codified as Article I of Chapter 18, Solid Waste, of the Code of Ordinances of the City of Plano is hereby repealed.

Section II. A revised Article I of Chapter 18, Solid Waste, of the Code of Ordinances of the City of Plano is hereby adopted to read in its entirety as follows:

"ARTICLE I. IN GENERAL

Sec. 18-1. Rules and Regulations Governing Containers and Receptacles

With the approval of the City Manager, the Director of Sustainability & Environmental Services or his designee is authorized to promulgate and enforce rules and regulations administratively, not contrary to the provisions of this chapter, which govern the receptacles and containers to be used, the contents to be placed therein and the method of preparing them for collection, and every owner, occupant, tenant or lessee using or occupying any building, house or structure within the corporate limits of the City for any purpose shall abide by such rules and regulations.

Sec. 18-2. Definitions

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Authorized Commercial Contractor means a person, firm, partnership, corporation, or other entity authorized under and by virtue of a permit, contract or franchise agreement with the City of Plano to collect recyclable and/or solid waste materials within the corporate city limits of the City of Plano.

Biodegradable container means any container made of a substance that will break down in content over a specified period of time and will have no harmful effect on the surrounding environment. The biodegradable container must be approved by the City of Plano.

Bulky waste means solid waste items of such size or quantity that it cannot feasibly be collected in a normal solid waste collection. Bulky waste includes, but is not limited to: furniture, carpet, concrete, automobile tires, mattresses, dirt, bricks, and appliances.

Commercial account means solid waste and recycling disposal and collection service provided in reusable containers at any location other than a single-family residence or duplex.

Commercial customer means all those persons, corporations, businesses and institutions receiving solid waste and recycling collection services from an authorized commercial contractor at any location other than a single-family residence or duplex.

Commercial Recycling Services shall include collecting, transporting and processing of recyclable materials, C&D recyclable materials and organic recyclable materials from commercial customers.

Commercial solid waste container shall include all on premise reusable receptacles designed to hold solid waste and shall specifically include all roll-off open top containers, roll-off closed top containers, roll-off compaction containers and all those receptacles with a volume of between two (2) cubic yards and ten (10) cubic yards, inclusive, provided however, that container shall not include:

(a) Any receptacle used for accumulating and/or holding materials to be recycled;

(b) Any receptacle provided by or through the City of Plano for accumulating and/or holding solid waste.

Construction and demolition debris means solid waste generated from construction, remodeling, repair and demolition of structures; road building and land clearing. Construction and demolition debris includes but is not limited to bricks, concrete, rebar and other masonry material, gypsum based sheetrock, soil, rock, lumber, metal, paving material, and tree and brush stumps.

Construction & demolition recycling means those materials that have been separated from the normal construction debris for the purpose of recycling. Acceptable items include segregated wood, concrete or asphalt, brick, and metal.

Director shall mean the Director of Sustainability & Environmental Services of the City of Plano or their designee.

Environmental Waste Services Division means the division of the City of Plano Sustainability & Environmental Services Department responsible for environmental waste management, including but not limited to: collection, transportation and disposal of solid waste, landscape waste, bulky waste and recyclable materials. The EWSD is also responsible for enforcing the provisions of this Chapter and other related ordinances of the City of Plano.

Household hazardous waste means any solid waste identified or listed as a household hazardous waste by the administrator of the United States Environmental Protection Agency (EPA) pursuant to Federal law. Household hazardous waste includes, but is not limited to: ammonia-based cleaners, drain and oven cleaners, fire extinguishers, floor care products, furniture and metal polishes, insect sprays, aerosol spray paint, antifreeze, automatic transmission and brake fluids, diesel fuel, gasoline, car batteries, automotive cleaning products, kerosene, latex paint, oil-based paint, motor oil, oil filters, paint stripper and thinner, propane tanks, turpentine, varnish, wood preservatives, fertilizer, fungicide, herbicide, pesticide, alkaline additives, pool chlorine and cleaners, muriatic acid, and pool shock treatment.

Landscape waste includes such items as yard trimmings, brush, clean wood material, tree trimmings, vegetative material, leaves, grass clippings (no sod), mixed yard waste, leaf mulch, shrubbery, sawdust, Christmas trees, wood chips, wood demolition debris (non-painted), wood fence material (non-painted), wood pallets, old corrugated containers, and tree trunks no greater than eight feet (8') long, and any other landscape waste material conducive to the composting process.

Manageable pile means that debris/materials are staged for collection and stacked in an organized manner in piles no larger than 4' wide, 4' high and 6' long, which is safe for a two-person crew to move by hand from the staging point into the rear of a collection vehicle.

Non-franchisee commercial customer means any church, business, medical office, or other non-residential customer generating volumes of solid waste that can be contained in a 95-gallon container and that can be serviced by the City's residential collection crews, as determined by the Environmental Waste Services Division.

Organics recycling means the separation of food waste, paper serving items, napkins, wax-coated paper beverage containers, cooking oil, and landscape waste from other solid waste for the purpose of composting.

Person means any individual or any association, firm, partnership, joint venture, corporation or other legally recognized entity, whether for profit or not for profit.

Recyclable materials mean those materials that have been separated from other solid waste materials and placed at a designated collection location for the purpose of collection and recycling. These materials include, but are not limited to: newspapers, magazines, all paper, junk mail, telephone books, boxboard or chipboard boxes, corrugated cardboard, aluminum and bi-metal cans, including aerosol cans, glass, all plastic bottles or containers bearing the "1", "2", "3", "4",

"5", "6" (excluding Styrofoam) or "7" symbol, and such other items as may be designated by the Environmental Waste Services Division.

Recycling container refers to the container furnished and designated by the City to hold recyclable materials.

Residential customer means persons, including but not limited to, owners, occupants, tenants or lessees receiving solid waste and recycling collection services from the Environmental Waste Services Division at a single-family residence or duplex.

Residential solid waste container refers to any reusable plastic container designed to hold solid waste and furnished by the City of Plano or its authorized designee.

Solid waste means any and all garbage, trash, refuse and other discarded material held or accumulated in containers, including, without limitation, animal and vegetable waste materials resulting from the preparation, processing or consumption of food; combustible waste material such as paper, rags, cartons, boxes, rubber tires, plastics; noncombustible waste materials such as glass, crockery and metal cans; however, Solid Waste shall not include hazardous waste or biomedical waste.

Special paid collection means the removal of bulky waste items outside of the regularly scheduled bulky waste collection as requested by the residential or commercial customer or as required by the City.

Sec. 18-3. Penalty

Any person found to be violating any term or provision of this Chapter, shall be subject to a fine in accordance with Section 1-4(a) of the City Code of Ordinances for each offense. Every day a violation continues shall constitute a separate offense.

Sec. 18-4 Obstructions in Alleyways

The Director shall be responsible for the safe passage of collection vehicles through City alleyways to include tree trimming and brush removal as necessary.

Sec. 18-5. Frequency and Schedule of Collection by the City

(a) The Environmental Waste Services Division of the City of Plano shall be the exclusive provider of solid waste, recycling and landscape waste

collection for residential and non-franchisee commercial customers in the City of Plano.

(b) The frequency and schedule of residential and non-franchisee commercial collection of solid waste and landscape waste shall be weekly and the collection of recyclable material shall be bi-weekly. The Director has the authority to revise the collection schedules as deemed necessary for holidays or other compelling reasons.

Sec. 18-6. Residential Solid Waste Container

(a) Residential customers and non-franchisee commercial customers shall utilize a specified collection container for the collection and removal of solid waste, one such container will be distributed by the City of Plano or a representative of the City at no cost to the residential or non-franchisee commercial customer. The container shall remain the property of the City and shall not be removed from the property when changing residences

(b) The City will replace the container, at no cost to the customer, if the assigned container is stolen or damaged beyond repair by any reason other than the customer's own neglect or misuse. If the container is lost or damaged beyond repair as a result of the customer's neglect or misuse, a fee to cover the costs for the replacement of the container will be charged to the customer by the City.

(c) The occupant shall promptly notify the Environmental Waste Services Division in the event the container is stolen or damaged.

(d) When storing the container or when the container has been set out for collection, the lid must be kept closed at all times to prevent any accumulation of water. No bags, boxes or other items shall be placed on the top of the closed container lid so as to hinder servicing of the container.

(e) Solid waste placed in the residential solid waste container must be contained in either plastic or paper bags to help prevent odors and to prevent the contents from blowing out of the container when the container is being emptied.

(f) Residential customers are prohibited from putting construction debris, hot ashes, oil, corrosive solvents, pool chemicals, car batteries or other hazardous substances in the residential solid waste container.

(g) Any container containing more than two hundred (200) pounds of solid waste will not be serviced.

(h) Except for City-designated holiday weeks, the City will not pick up any trash stored outside the residential solid waste container.

(i) If a residential or non-franchisee commercial account serviced by the City regularly generates more solid waste than can be placed in the residential solid waste container for the once-a-week collection, the City will require the residential customer to obtain an additional residential solid waste container and that customer will be charged a one-time delivery fee, as well as, an additional monthly fee for the second container on the customer's utility bill.

(j) The residential or non-franchisee commercial customer shall be responsible for maintaining the residential solid waste container in a clean condition.

(k) The residential solid waste container shall not be marked or defaced in any way without prior authorization by the Environmental Waste Services Division Manager.

(l) No person other than the residential customer, non-franchisee commercial customer, Environmental Waste Services Division employee, or an authorized solid waste contractor may remove, collect or transfer solid waste materials that have been placed in a residential solid waste container or along side the container in the City of Plano. Each violation of this provision shall constitute a separate and distinct offense punishable as provided in Section 18-3 of this Chapter.

Sec. 18-7. Solid Waste to be Drained; Animal Matter to be Wrapped in Paper

All solid waste that is mixed with water or any other liquid shall be drained before being placed in a container or receptacle. All animal matter that is subject to decomposition shall be well wrapped in paper or other combustible material before being deposited in such container or receptacle.

Sec. 18-8. Recycling Container

(a) Residential customers and non-franchisee commercial customers shall utilize a specified collection container for the collection and removal of recyclable materials, as defined herein. The City or the City's designated representative will distribute one recycling container to the residential customer or non-franchisee commercial customer at no cost to the customer. The container shall remain the property of the City and shall not be removed from the property when changing residences.

(b) Customer use of the residential recycling container shall be subject to the same regulations for placement, storage, repair, replacement, and care as specified herein for residential solid waste containers.

(c) If a residential or non-franchisee commercial account serviced by the City regularly generates more recyclables than can be placed in the residential recycling container for the bi-weekly collection, the City will provide the residential or non-franchisee customer with a second recycling container at no additional fee.

(d) No person other than the residential customer, non-franchisee commercial customer, Environmental Waste Services Division employee, or an authorized recycling contractor may remove, collect or transfer recyclable materials that have been placed in a recycling container in the City of Plano. Each violation of this provision shall constitute a separate and distinct offense punishable as provided in Section 18-3 of this Chapter.

Sec. 18-9. Placement of Containers for Collection

(a) Placement of Containers in Alley: Residential solid waste and recycling containers set out for alley collection should be aligned with the handles facing the house and located within two (2) feet of the paved alley. The containers must also be located at least six (6) inches from any fence and at least eighteen (18) inches from any gas or electric meter, other containers or other large objects so that the container is accessible to the automated collection vehicle. Residential solid waste and recycling containers located behind fences, inside garages or outside the collection area described above will not be serviced. Under no circumstances will City employees or contractors leave the public rights-of-way to enter garages, breezeways, carports or other structures to make collections. If it is not practicable to place the containers for collection as specified above, the Environmental Waste Services Manager shall determine where the containers will be placed for collection. If it is not practicable to collect and remove the solid waste and recyclables from an alley or if there is no alley adjacent to the residential or commercial premises, the residential or non-franchisee commercial customer shall place the containers on the parkway.

(b) Placement of Containers on Parkway: Residential solid waste and recycling containers set out for street collection should be aligned with the handles facing the house and located within two (2) feet of the paved curb and at least eighteen (18) inches from any mailbox, other container or other large object. The residential or non-franchisee commercial customer with street collection is prohibited from placing the container at the collection point prior to twelve (12) hours before collection.

(c) Removal of Solid Waste and Recycling Containers Following Collection:

(1) The residential and non-franchisee commercial customer with street collection is required to remove the solid waste and recycling containers from the collection area and to relocate them to a place within six (6) feet of the residential or non-franchisee commercial structure within twelve (12) hours after the containers are serviced by the Environmental Waste Services Division.

(2) The residential and non-franchisee commercial customer with alley collection is encouraged to remove the solid waste and recycling containers from the collection point and to move them to a secure location within twelve (12) hours after the containers are serviced by the Environmental Waste Services Division.

Sec. 18-10. Blocking Access to Containers

It shall be unlawful to stop, stand, or park a vehicle or trailer on public or private property in a manner that prevents access to a solid waste or recycling collection container by a collection truck that is attempting to service the container. For the purposes of this section, it shall be presumed that the owner of record of any violating vehicle or trailer is the person who stopped or parked the vehicle or trailer in the offending location.

Sec. 18-11. Household Hazardous Waste Collection and Reuse

(a) The Environmental Waste Services Division operates a Household Chemical Collection and Reuse Program as a means to divert certain Household Hazardous Waste ("HHW") from the landfill and make them available for reuse by other citizens. The Environmental Waste Services Division will determine the collection fees for a HHW collection, and when feasible, the charges will be posted to the customer's monthly utility bill. The City will operate the Household Chemical Collection Program in accordance with the procedures set forth below.

(b) The residential or non-franchisee commercial customer shall place the HHW out for collection next to the residential solid waste container on the morning of scheduled pickup by the City. HHW shall not be placed inside the residential solid waste or recycling containers or concealed by any other means. The HHW should be placed in a box clearly marked "Chemicals" or "HHW" and placed out for collection in full view of the collection crews by 7:00 a.m. on the day of collection.

(c) To schedule a pickup, residential customers should contact the Environmental Waste Services Division at least 24 hours prior to the scheduled

HHW collection day. No more than fifteen (15) gallons of HHW will be picked up from a residential customer in one day. Additionally, no single container may exceed five (5) gallons in size. All containers must be clearly labeled, properly sealed, and not leaking. Containers that do not meet these criteria will not be picked up.

(d) The HHW Program is restricted to chemicals used in household quantities and is not intended for commercial grade, quantities, and materials. Certain chemicals and products are not eligible for the HHW Collection and Reuse Program because of safety concerns and require special handling for safe disposal. The following items will not be accepted for HHW collection: expired medication, ammunition, arsenic, chemicals not in there original containers with the exception of used motor oil, explosives, medical waste with the exception of used syringes contained within a puncture proof container, mercury, nuclear/radioactive waste, thermometers, chemical containers larger than five gallons, and all unidentified chemicals. The customer service of the Environmental Waste Services Division can assist residents with appropriate disposal of non-acceptable items.

(e) Reusable items collected through the HHW Program including paint, household cleaners, pool chemicals, automotive products, repair products, and pet supplies are available to residents of Plano, at no charge, at the City's HHW Reuse Center. Hours of operation and location of the HHW Reuse Center are posted on the City's Web site.

(f) An environmental fee of $125.00 will be charged for each liquid fire extinguishers and $35.00 will be charged for each propane tank or cylinder scheduled for collection and disposal to cover the City's operational and administrative costs associated with verifying these items are disposed of in accordance with state established guidelines.

Sec. 18-12. Regulated Industrial and Hazardous Waste.

It shall be unlawful for any individual, persons, or organization to discard or otherwise dispose of any regulated hazardous waste, as that term is defined and listed by the United States Environmental Protection Agency (EPA) under the Federal Solid Waste Act, Resource Conservation and Recovery Act (RCRA) and Code of Federal Regulations (CFR) within the City of Plano, except through an approved method as defined and regulated by Title 30 of the Texas Administrative Code (TAC) Chapter 335.

Sec. 18-13. Landscape Waste Collection/Biodegradable Bags

The City diverts 100% of its residential landscape waste from the landfill and processes it to produce compost, mulch, and compost-related products under the "Texas Pure" label.

(a) The City will promote and encourage its citizens to use lawnmowers with mulching blades rather than bagging cut grass. By using mulching lawnmowers and leaving grass clippings on the lawn, the City and its citizens will divert significant quantities of bagged landscape waste from the landfill. The City will also encourage the citizens, when feasible, to prepare and maintain their own composting areas.

(b) In the instances where the citizens cannot feasibly allow the clippings to remain on their lawns, the clippings may be accumulated and put out for collection using only biodegradable bags that have been approved as specified by the City of Plano.

(c) All biodegradable bags placed out for collection must be tightly folded and must not be filled above the dotted line indicated on the bag. A filled bag must weigh no more than fifty (50) pounds. There shall be no contents, other than grass, leaves, limbs and other such items designated as landscape waste, placed in the biodegradable bags. Failure to utilize the specified biodegradable bags where appropriate will result in non-collection of bagged landscape waste.

(d) Bagged landscape waste shall be placed at the appropriate collection point, as specified herein, on the same day as solid waste collections. Due to the large and bulky size of certain types of landscape waste, some items may have to be stacked just outside the normal collection area. Environmental Waste Services collection crews will collect stacked landscape waste materials outside the normal collection area as long as one end of the stacked pile is no further than six feet from the normal collection area.

(e) Tree trimmings, brush, shrubs, and other landscape waste shall be placed in manageable piles of no more than six feet in length, four feet in height and width, and no more than fifty (50) pounds in weight, at the appropriate collection point, as specified herein.

(f) Large corrugated cardboard boxes are collected with landscape waste and shall be placed at the appropriate collection point, as specified herein. Boxes must be empty and flattened.

(g) Wooden fence material is acceptable if sections are no longer than 4' x 6' and hinges, latches and bolts have been removed. No painted or stained wood can be accepted in the weekly collection but can be accepted with the monthly Bulky Waste Collection Program.

Sec. 18-14. Bulky Waste and Special Paid Collections

(a) Bulky Waste Collection.

(1) The City of Plano deems it beneficial to provide bulky waste collection to its residential and non-franchisee commercial customers one day per month. Bulky waste includes items not classified as landscape waste which are too large to be placed in the residential solid waste or recycling containers. Landscape waste, including unpainted fence material, that is not placed out for weekly landscape waste collection as provided in Section 18-13 herein does not qualify as bulky waste and will require a special paid collection.

(2) Bulky waste may not be placed out for collection more than five days before the designated bulky waste collection day. If the bulky waste remains uncollected for more than five days and the Manager of the Environmental Waste Services Division determines that the Bulky Waste is creating a health and/or safety hazard, the City retains the right to call for a Special Paid Collection and to charge the associated costs for collecting the bulky waste to the responsible resident or non-franchisee commercial customer's utility bill.

(3) Dirt, rocks, concrete, bricks, and similar materials will not be collected for disposal unless they are placed in appropriate containers. No such container may exceed fifty (50) pounds in weight. Customers may contact the Environmental Waste Services Division for information on appropriate containers.

(4) Large amounts of construction debris generated by a private contractor in connection with a construction project or major renovation project will not be eligible for bulky waste collection and must be scheduled for a special paid collection.

(5) An environmental fee of $25.00 will be charged for each appliance scheduled for collection and disposal to cover the City's operational and administrative costs associated with verifying that all refrigerants, including, but not limited to: freon, chlorinated fluorocarbons (CFC) or polychlorinated biphenyls (PCB) have been removed from the appliance in accordance with state established guidelines. This fee will be added to the customer's monthly utility bill.

(6) Due to the size and nature of bulky waste items, these items may be

be placed just outside the normal collection area, as defined herein, as long as those items do not create an immediate health and/or safety hazard. The collection crews for the Environmental Waste Services Division will collect bulky waste items outside of the normal collection area, as long as one end of the stacked pile is no further than six feet from the normal collection point.

(b) Special Paid Collections

(1) The City of Plano deems it necessary to offer a special paid collection service to its citizens for off-schedule collection of bulky waste items, landscape waste, and other large or cumbersome quantities of solid waste that have not been collected through normal collection services.

(2) Special paid collections must be scheduled in advance and shall be coordinated through the Environmental Waste Services Division. The Environmental Waste Services Division will determine the fees for a special paid collection, and when feasible, the charges will be posted to the customer's monthly utility bill.

(3) Items for special paid collection, with the exception of large brush piles, shall not be placed out for collection, as specified herein, more than five days prior to the designated collection day.

(4) Dirt, rocks, concrete, bricks, and similar materials will not be collected for disposal unless they are placed in appropriate containers. No such container may exceed fifty 50 pounds in weight. Customers may contact the Environmental Waste Services Division for information on appropriate containers.

(5) An environmental fee of $25.00 will be charged for each appliance scheduled for collection and disposal to cover the City's operational and administrative costs associated with verifying that all refrigerants, including, but not limited to: freon, chlorinated fluorocarbons (CFC) or polychlorinated biphenyls (PCB) have been removed from the appliance in accordance with state guidelines. This fee will be added to the customer monthly utility bill.

(6) Due to the size and nature of bulky waste items, these items may be placed just outside the normal collection area, as defined herein, as long as those items do not create an immediate health and/or safety hazard. The collection crews for the Environmental Waste Services Division will collect bulky waste items outside of the

normal collection area, as long as one end of the stacked pile is no further than six feet from the normal collection point.

Sec. 18-15. All Collections to be Placed for Collection by 7:00 a.m.

Failure to place solid waste containers, recyclable containers, landscape waste material, HHW materials, bulky waste, and special paid collection waste at its proper collection point, by 7:00 a.m. on the specified collection day may result in the items not being collected.

Sec. 18-16. Disposal at Transfer Stations

Residential customers are allowed two trips per month to any of the North Texas Municipal Water District ("NTMWD") transfer stations to dispose of excessive residential solid waste. A valid driver's license and current City of Plano utility bill will be required for service. All loads must be tarped during transport in accordance with State law.

Sec. 18-17. Sale of Compost

(a) The City of Plano deems it beneficial to produce and market organic compost to offset expenses associated with providing a separate landscape waste collection service, and to divert landscape waste from the landfill and convert it into a useful product.

(b) Collected landscape waste and commercial organics are transported to the City of Plano's Custer Road and FM 545 Composting Facilities to produce organic compost, topdressing, soil blend, mulch, and an erosion control mix. These products, marketed under the "Texas Pure" label, are made available for sale to retail and wholesale markets. Special rates are offered to Plano residential customers and City of Plano employees.

Sec. 18-18. Collection, Transportation and Disposal of Commercial Solid Waste and Recyclable Materials

(a) Commercial Solid Waste. No person shall engage in the business of collecting, transporting and disposing of solid waste materials for commercial customers located within the City of Plano, and no person shall use the public streets, alleys or thoroughfares within the corporate city limits of the City of Plano for the purpose of engaging in such business, other than a person who has executed a contract with the City.

(b) Commercial Recyclable Materials. No person other than the owner, his authorized agent, the Environmental Waste Services Division, or a permitted recycling services provider, as described in Section 18-21, may collect or transport

recyclable materials from the property of a commercial customer located in the City of Plano, Texas. Each violation of this provision shall constitute a separate and distinct offense punishable as provided in Section 18-3 of this Chapter.

(c) Auditing and Enforcement. The Environmental Waste Services Division of the City of Plano may periodically perform recycling audits of commercial accounts in the City to verify that the materials being collected in recycling containers are source-separated recyclables, as listed on the permit, and are free from solid waste or other non-recyclable materials, except for the incidental amounts of non-recyclable waste allowed in the C&D recycling materials. Each commercial customer in the City of Plano that contracts with a recycling provider is responsible for ensuring that their recycling provider(s) is authorized and registered with the City of Plano to collect and transport recyclable materials in the City of Plano. Each and every violation of this Section shall constitute a separate and distinct offense punishable as provided in Section 18-3 of this Chapter.

Sec. 18-19 Commercial Organics Recycling

(a) The City deems it beneficial to expand present recycling programs to include recycling of organic wastes, such as food wastes generated from restaurants. The Environmental Waste Services Division will operate the organic recycling program in accordance with the procedures set forth below.

(b) The Environmental Waste Services Division will provide participants in the organics recycling program with the necessary educational materials, staff training, collection containers, and collection service to support source-separation of the organic materials.

(c) Acceptable organic waste materials collected through the organics recycling program will be diverted to the City's composting facilities for use in the composting process.

(d) A condition of participation in the organics recycling program is that participants must ensure that their organic recycling materials are free from non-compostable material.

(e) Participants in the organics recycling program must also maintain their organic waste recycling container in a clean condition in compliance with this ordinance and Chapter 9 of the Plano Code of Ordinances.

(f) Participants further agree that they will not exceed the holding capacity of their organics recycling containers.

Sec. 18-20 Construction and Demolition Debris Recycling Deposit Program

(a) The City of Plano deems it beneficial to the City and its citizens to initiate a program for recycling construction and demolition debris. The Construction and Demolition ("C&D") Recycling Deposit Program will be operated in accordance with the procedures set forth below.

(b) All C&D Recycling Service Providers desiring to collect, remove, and transport C&D recyclable materials in the City must be registered with the Environmental Waste Services Division, as provided for in Section 18-21.

(c) C&D Recycling Service Providers must provide the requisite number of containers on each construction site to separate the C&D recyclable materials from the non-recyclable solid waste materials.

(d) Until a commingled C&D material recycling facility has been approved by the City, C&D recyclable materials must be source-separated in commercial containers, transported and processed at an authorized C&D recycling facility. Only incidental amount(s) of non-recyclable waste, as defined by Section 328.2 of the Texas Administrative Code, will be allowed in these containers.

(e) The acceptable source-separated C&D recyclable materials collected within each container will be governed by the processing capability of the specific C&D recycling facility being used. Every registered C&D Recycling Service Provider operating in the City of Plano will be required to provide the name, address and telephone number of each C&D recycling facility they use for each construction site.

(f) Except as otherwise specified in this section, on or after January 1, 2009, each person who applies for a building permit pursuant to Chapter 6 of this Code shall complete a construction and demolition debris deposit form to be issued by the Chief Building Official. On or after January 1, 2009, no building permit shall be issued unless the applicant submits the deposit form issued by the Chief Building Official and associated C&D deposit. The C&D recycling deposit will be determined by the Environmental Waste Services Division.

(g) Neither a construction and demolition debris deposit form nor a C&D deposit will be required for any of the following:

(1) Work for which a building permit is not required under Chapter 6.
(2) Projects less than 3,000 square feet in size.
(3) Installation of pre-fabricated enclosures or structures in which no foundation or structural modifications are required.
(4) New and replacement roofing projects.

(5) Installation of swimming pools, hot tubs, patios, sunrooms, or other one room residential projects.
(6) Projects for which only mechanical, electrical, plumbing, or HVAC permits are required.

Sec. 18-21. Registration of Commercial Recycling Service Providers and Transporters

(a) *Prohibited without permit.* No person shall provide commercial recycling services in the City of Plano or operate a motor vehicle for the purpose of transporting commercial recycling containers on a public street or alley within the corporate city limits of the City of Plano without first registering and obtaining a permit from the Environmental Waste Services Division of the City of Plano.

(b) *Permit within each vehicle.* Each motor vehicle utilizing the public streets or alleys in the City of Plano to collect or transport, recyclable materials from commercial customers shall at all times carry a valid permit issued by the Environmental Waste Services Division.

(c) *Exceptions.* The provisions of this Section do not apply to:

(1) Any commercial contractor who has a contract with the City of Plano for collecting and transporting solid waste materials from commercial accounts and has a separate reporting requirement for recyclable materials;

(2) Any person, firm, or business transporting recyclable materials from City residential or non-franchisee commercial accounts and has a separate reporting requirement for recyclable materials.

(d) *Report.* As a condition of annual registration with the City, all commercial recycling service providers and transporters shall submit a written report, utilizing the City's form, providing the following information:

(1) The weight, in the appropriate unit of measure, for each type of material recycled; and

(2) The origin of recyclable material.

(e) *Submittal date.* The report shall be submitted to the Environmental Waste Services Division no later than the fifteenth (15) day of each month following the reported month. With written approval from the Environmental Waste Services Division Manager, or their designee, the report may be submitted quarterly on the fifteenth (15) day of the first month following the reported quarter.

(f) *Default.* In the event a commercial recycling services provider or transporter defaults under any of the terms of their registration or permit with the Environmental Waste Services Division ("EWSD"), the EWSD will provide written notice of the areas of default to the recycling services provider or transporter. The recycling services provider or transporter shall then have ten (10) business days to correct the default and provide City with evidence that the default has been cured.

(g) *Revocation of Permit.* If the commercial recycling services provider or transporter fails to correct the noticed default within the time provided herein, the EWSD may revoke the registration and permit of said recycling services provider or transporter.

Sec. 18-22. Ownership of Recyclable Materials

Recyclable materials placed in or adjacent to a residential recycling container or commercial recycling container for collection become the property of the entity that issued the recycling container.

Sec. 18-23. Right of Individual to Dispose of Recyclable Materials

Nothing in this Chapter shall limit the right of an individual person, organization, or other entity to donate, sell, or otherwise dispose of recyclable materials, provided that any such disposal is in accordance with the provisions of this Chapter.

Sec. 18-24. Civil Action by Authorized Recycling Contractor

Nothing in this Chapter shall be deemed to limit the right of the authorized recycling contractor to bring a civil action against any person who violates the above-described sections of this Chapter, nor shall a conviction for such violation exempt any person from a civil action brought by an authorized recycling contractor."

Section III. All provisions of the Ordinances of the City of Plano, codified or uncodified, in conflict with the provisions of this Ordinance are hereby repealed, and all other provisions of the Ordinances of the City of Plano, codified or uncodified, not in conflict with the provisions of this Ordinance, shall remain in full force and effect.

Section IV. It is the intention of the City Council that this Ordinance, and every provision thereof, shall be considered severable, and the invalidity or unconstitutionality of any section, clause, provision or portion of this Ordinance shall not affect the validity or constitutionality of any other portion of this Ordinance.

Section V. The repeal of any Ordinance or part of Ordinances effectuated by the enactment of this Ordinance shall not be construed as abandoning any action now pending under or by virtue of such Ordinance or as discontinuing, abating, modifying, or altering any penalty accruing or to accrue, or as affecting any rights of the municipality under any section or provisions of any Ordinances at the time of passage of this Ordinance.

Section VI. Any person, firm, or corporation violating any of the provisions or terms of this Ordinance shall be subject to a penalty as provided for in Section 1-4(a) of the City of Plano Code of Ordinances.

Section VII. This Ordinance shall become effective from and after its passage.

PASSED AND APPROVED this 22nd day of September, 2008.

Pat Evans, MAYOR

ATTEST:

Diane Zucco, CITY SECRETARY

APPROVED AS TO FORM:

Diane C. Wetherbee, CITY ATTORNEY

Appendix E

Plano, Texas, General Recycling Provider Application

Plano
Commercial Recycling

GENERAL RECYCLING APPLICATION
COMMERCIAL RECYCLING SERVICE PROVIDER

This Construction & Demolition Recycling Permit allows removal of recyclable materials from construction sites as provided in Ordinance No. 2008-9-35 §II, Sept 22, 2008 which requires all commercial recycling service providers and commercial transporters of recyclable materials in the City of Plano, Texas to register with Commercial Waste and Recycling. ***Containers must be clearly marked with company name and phone number.***

Other permit requirements are listed below and must be adhered to in conjunction with all stated requirements in this application. Incomplete applications will not be processed.

It shall be unlawful for any person to use this registration for collection of solid waste using commercial recycling containers.

GENERAL RECYCLING MATERIAL

Paper (magazines, newspaper, office, OCC)
Glass (clear/colored, other)
Metal (aluminum/steel cans, appliances, scrap)
Plastic (containers)
Organic (food, brush, grass, untreated wood)
Single-Stream (all materials in one container)

ANNUAL FEES

$200.00 Permit
$12.00 per Vehicle
$150.00 per Contracted Transporter

PRORATED FEES

All permits will have a September 30 expiration date. Prorated fees for September expiration are as follows:

Permit Cost

1 Mo	2 Mo	3 Mo	4 Mo	5 Mo	6 Mo
$16.67	$33.34	$50.01	$66.68	$83.35	$100.02

7 Mo	8 Mo	9 Mo	10 Mo	11 Mo	12 Mo
$116.69	$133.36	$150.03	$166.70	$183.33	$200.00

Vehicle Cost (Per Vehicle)

1 Mo	2 Mo	3 Mo	4 Mo	5 Mo	6 Mo
$1.00	$2.00	$3.00	$4.00	$5.00	$6.00

7 Mo	8 Mo	9 Mo	10 Mo	11 Mo	12 Mo
$7.00	$8.00	$9.00	$10.00	$11.00	$12.00

Contracted Transporter Cost

1 Mo	2 Mo	3 Mo	4 Mo	5 Mo	6 Mo
$12.50	$25.00	$37.50	$50.00	$62.50	$75.00

7 Mo	8 Mo	9 Mo	10 Mo	11 Mo	12 Mo
$87.50	$100.00	$112.50	$125.00	$137.50	$150.00

VEHICLE PERMIT

Registered haulers will receive permits for approved vehicles. Only permitted vehicles will be allowed to transport recyclable material in the City of Plano.

PAYMENT PROCEDURES

Checks payable and mailed to:
Commercial Waste & Recycling
City of Plano
4200 West Plano Parkway
Plano, TX 75093

Credit card payment:
Contact Athena Ancheta at 972-769-4393
or aancheta@plano.gov
(A fee of 3% will be added to the total)

For inquiries call 972-769-4393 or click on **Commercial Waste and Recycling**

GENERAL APPLICATION — BUSINESS

SECTION I: Business Information		
Name		
Address	City/State	ZIP Code
Mailing Address	City/State	ZIP Code
Business Phone	Website	

SECTION II: Contact Information	
Name	Title
E-Mail Address	Phone

SECTION III: Application Information

Application Fees		Amount Due
General Recycling	$200.00	
Vehicles	$12.00 per vehicle	
Contracted Transporter	$150.00 per transporter	
	TOTAL DUE	

SECTION IV: Vehicle Information *(List each vehicle to be used for recycling. Additional sheets allowed.)*

Year	Make	Model	License Plate Number

SECTION V: Contracted Transporters

	Y/N		Y/N
Does this application involve Contracted Transporters?		If yes, have you listed them on the Contracted Transporters page?	

Removal of Non-Recyclable Material

In the event a Commercial Recycling Service Provider or commercial transporter defaults under any of the terms of their registration or permit with Commercial Waste & Recycling, after notice and an opportunity to cure, Commercial Waste & Recycling may revoke the registration and permit. **Any violation of City Code requirements for commercial recycling are subject to penalty under Section 1-4 of the Code of Ordinances of the City of Plano and may result in fines up to $2000.**

Applicant Signature	Title
Print Name	Date

COP USE ONLY	Date Received	Credit Card Payment Y ☐ N ☐	Check #	Amount Paid $	Processed by
Application Complete Y ☐ N ☐		Missing	Date Processed	Expiration Date **September 30, 2025**	

Applicant Business Name

Processing facilities have the responsibility to show historical records that substantiate their proven ability to recycle item(s) accepted for diverting from local or regional landfills to be an approved processor by the City's Environmental Waste Services Division.

Your application will not be approved if this page is not submitted. Additional pages may be attached, if necessary.

Facility		
Company Name		
Address	City	ZIP Code
Contact Name	Phone Number	
Email Address		
List material your business will recycle at this facility (i.e., paper, glass, metal, etc.):		

Facility		
Company Name		
Address	City	ZIP Code
Contact Name	Phone Number	
Email Address		
List material your business will recycle at this facility (i.e., paper, glass, metal, etc.):		

Facility		
Company Name		
Address	City	ZIP Code
Contact Name	Phone Number	
Email Address		
List material your business will recycle at this facility (i.e., paper, glass, metal, etc.):		

Facility		
Company Name		
Address	City	ZIP Code
Contact Name	Phone Number	
Email Address		
List material your business will recycle at this facility (i.e., paper, glass, metal, etc.):		

Applicant Business Name

Each commercial recycling service provider who contracts with a recycling provider (contracted transporter) is responsible for ensuring that their recycling provider(s) is authorized and registered with the City to collect and transport recyclable materials in the City.

List the name and contact information for each contracted transporter that will be utilized during the timeframe your permit is active. Additional pages may be attached.

If you selected No in Section V, this page may be deleted from your application.

Contracted Transporter		
Company Name		
Address	City	ZIP Code
Contact Name	Phone Number	
Email Address		
Type of Material to be Transported:		
Contracted Transporter		
Company Name		
Address	City	ZIP Code
Contact Name	Phone Number	
Email Address		
Type of Material to be Transported:		
Contracted Transporter		
Company Name		
Address	City	ZIP Code
Contact Name	Phone Number	
Email Address		
Type of Material to be Transported:		
Contracted Transporter		
Company Name		
Address	City	ZIP Code
Contact Name	Phone Number	
Email Address		
Type of Material to be Transported:		

City of Plano
General Recycling Tonnage Report
Commercial Recycling Service Provider

As a condition of annual registration with the city of Plano, all Commercial Recycling Service Providers and transporters shall submit a written report providing weight, in the appropriate unit of measure, for each type of material recycled, and the origin of recyclable material. Reports are due quarterly.

Reporting Period	October-December	January-March	April-June	July-September
Date Due	January 15	April 15	July 15	October 15

DO NOT COMPLETE
This is a sample only a Report will be provided when due.
This page may be deleted from your application.

BUSINESS NAME			
COMPLETED BY			
TONNAGE			
Material Type	**Tons Hauled by Permitted Hauler**	**Tons Hauled by Contracted Transporter**	**Total Tons**
PAPER			
Newspaper/Magazines			
Corrugated Cardboard (OCC)			
White/Computer			
Mixed/Office			
Brokered			
TOTAL			
GLASS			
Clear/Colored			
Other			
TOTAL			
METAL			
Aluminum/Steel Cans			
Appliances			
Scrap Steel			
Other			
TOTAL			
PLASTIC			
Containers			
TOTAL			
ORGANIC			
Food Waste			
Wood/Lumber			
Landscape Waste/Trees			
Other			
TOTAL			
TOTAL TONNAGE			

NOTE: Commercial Waste and Recycling will send a copy of this report to each Permitted Hauler around the first of each quarter in which the report is due; however, reports are due regardless of receipt of such report.

If there is nothing to report for that quarter, an e-mail will be accepted stating that fact.

Appendix F

Plano, Texas, C&D Code

Sec. 18-18. Collection, transportation and disposal of commercial solid waste and recyclable materials.

(a) *Commercial solid waste.* No person shall engage in the business of collecting, transporting and disposing of solid waste materials for commercial customers located within the city, and no person shall use the public streets, alleys or thoroughfares within the corporate city limits of the city for the purpose of engaging in such business, other than a person who has executed a contract with the city.

(b) *Commercial recyclable materials.* No person other than the owner, his authorized agent, the environmental waste services division, or a permitted recycling services provider, as described in section 18-21, may collect or transport recyclable materials from the property of a commercial customer located in the city. Each violation of this provision shall constitute a separate and distinct offense punishable as provided in section 18-3 of this chapter.

(c) *Auditing and enforcement.* The environmental waste services division of the city may periodically perform recycling audits of commercial accounts in the city to verify that the materials being collected in recycling containers are source-separated recyclables, as listed on the permit, and are free from solid waste or other non-recyclable materials, except for the incidental amounts of non-recyclable waste allowed in the C&D recycling materials. Each commercial customer in the city that contracts with a recycling provider is responsible for ensuring that their recycling provider(s) is authorized and registered with the city to collect and transport recyclable materials in the city. Each and every violation of this section shall constitute a separate and distinct offense punishable as provided in section 18-3 of this chapter.

(Ord. No. 2008-9-35, § II, 9-22-08)

Sec. 18-19. Commercial organics recycling.

(a) The city deems it beneficial to expand present recycling programs to include recycling of organic wastes, such as food wastes generated from restaurants. The environmental waste services division will operate the organic recycling program in accordance with the procedures set forth below.

(b) The environmental waste services division will provide participants in the organics recycling program with the necessary educational materials, staff training, collection containers, and collection service to support source-separation of the organic materials.

(c) Acceptable organic waste materials collected through the organics recycling program will be diverted to the city's composting facilities for use in the composting process.

(d) A condition of participation in the organics recycling program is that participants must ensure that their organic recycling materials are free from non-compostable material.

(e) Participants in the organics recycling program must also maintain their organic waste recycling container in a clean condition in compliance with this article and chapter 9 of the Plano Code of Ordinances.

(f) Participants further agree that they will not exceed the holding capacity of their organics recycling containers.

(Ord. No. 2008-9-35, § II, 9-22-08)

Sec. 18-20. Construction and demolition debris recycling deposit program.

(a) The city deems it beneficial to the city and its citizens to initiate a program for recycling construction and demolition debris. The construction and demolition ("C&D") recycling deposit program will be operated in accordance with the procedures set forth below.

(b) All C&D recycling service providers desiring to collect, remove, and transport C&D recyclable materials in the city must be registered with the environmental waste services division, as provided for in section 18-21.

(c) C&D recycling service providers must provide the requisite number of containers on each construction site to separate the C&D recyclable materials from the non-recyclable solid waste materials.

(d) Until a commingled C&D material recycling facility has been approved by the city, C&D recyclable materials must be source-separated in commercial containers, transported and processed at an authorized C&D recycling facility. Only incidental amount(s) of non-recyclable waste, as defined by Section 328.2 of the Texas Administrative Code, will be allowed in these containers.

(e) The acceptable source-separated C&D recyclable materials collected within each container will be governed by the processing capability of the specific C&D recycling facility being used. Every registered C&D recycling service provider operating in the city will be required to provide the name, address and telephone number of each C&D recycling facility they use for each construction site.

(f) Except as otherwise specified in this section, on or after January 1, 2009, each person who applies for a building permit pursuant to chapter 6 of this Code shall complete a construction and demolition debris deposit form to be issued by the chief building official. On or after January 1, 2009, no building permit shall be issued unless the applicant submits the deposit form issued by the chief building official and associated C&D deposit. The C&D recycling deposit will be determined by the environmental waste services division.

(g) Neither a construction and demolition debris deposit form nor a C&D deposit will be required for any of the following:

(1) Work for which a building permit is not required under chapter 6.

(2) Projects less than three thousand (3,000) square feet in size.

(3) Installation of pre-fabricated enclosures or structures in which no foundation or structural modifications are required.

(4) New and replacement roofing projects.

(5) Installation of swimming pools, hot tubs, patios, sunrooms, or other one-room residential projects.

(6) Projects for which only mechanical, electrical, plumbing, or HVAC permits are required.

(Ord. No. 2008-9-35, § II, 9-22-08)

Sec. 18-21. Registration of commercial recycling service providers and transporters.

(a) *Prohibited without permit.* No person shall provide commercial recycling services in the city or operate a motor vehicle for the purpose of transporting commercial recycling containers on a public street or alley within the corporate city limits of the city without first registering and obtaining a permit from the environmental waste services division of the city.

(b) *Permit within each vehicle.* Each motor vehicle utilizing the public streets or alleys in the city to collect or transport, recyclable materials from commercial customers shall at all times carry a valid permit issued by the environmental waste services division.

(c) *Exceptions.* The provisions of this section do not apply to:

(1) Any commercial contractor who has a contract with the city for collecting and transporting solid waste materials from commercial accounts and has a separate reporting requirement for recyclable materials;

(2) Any person, firm, or business transporting recyclable materials from city residential or non-franchisee commercial accounts and has a separate reporting requirement for recyclable materials.

(d) *Report.* As a condition of annual registration with the city, all commercial recycling service providers and transporters shall submit a written report, utilizing the city's form, providing the following information:

(1) The weight, in the appropriate unit of measure, for each type of material recycled; and

(2) The origin of recyclable material.

(e) *Submittal date.* The report shall be submitted to the environmental waste services division no later than the 15th day of each month following the reported month. With written approval from the environmental waste services division manager, or their designee, the report may be submitted quarterly on the 15th day of the first month following the reported quarter.

(f) *Default.* In the event a commercial recycling services provider or transporter defaults under any of the terms of their registration or permit with the environmental waste services division ("EWSD"), the EWSD will provide written notice of the areas of default to the recycling services provider or transporter. The recycling services provider or transporter shall then have ten (10) business days to correct the default and provide city with evidence that the default has been cured.

(g) *Revocation of permit.* If the commercial recycling services provider or transporter fails to correct the noticed default within the time provided herein, the EWSD may revoke the registration and permit of said recycling services provider or transporter.

(Ord. No. 2008-9-35, § II, 9-22-08)

Appendix G

Boulder, Colorado, Deconstruction Ordinance

ORDINANCE 8366

AN ORDINANCE AMENDING TITLE 10, "STRUCTURES," B.R.C. 1981 BY ADOPTING AND MODIFYING INTERNATIONAL CODES REGARDING PROPERTY MAINTENANCE, RENTAL LICENSES, BUILDING, ELECTRICAL, ENERGY CONSERVATION, COMMERCIAL AND INDUSTRIAL ENERGY EFFICIENCY, FIRE, WILDLAND, MECHANICAL, FUEL GAS, AND PLUMBING; ADOPTING THE 2020 CITY OF BOULDER ENERGY CONSERVATION CODE; AND SETTING FORTH RELATED DETAILS.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF BOULDER, COLORADO:

Section 1. Chapter 10-1, "Definitions," B.R.C. 1981, is amended as follows:

10-1-1. - Definitions.

(a) The following terms used in this title have the following meanings unless the context clearly indicates otherwise:

....

Approved semi-rigid tubing connector means a flexible metal pipe connecting a gas residential dryer or range, if it meets the requirements of and is installed in accordance with the city fuel~~mechanical~~ gas code, or, if it is a commercial gas dryer or range, it is a connector supplied with the appliance from the manufacturer, or is an equivalent commercial grade flex connector, and is installed in accordance with the manufacturer's instructions.

....

Section 2. Chapter 10-2, "Property Maintenance Code," B.R.C. 1981, is amended as follows:

10-2-1. - Legislative Intent.

....

(d) The city council hereby adopts the 2018~~2012~~ edition of the *International Property Maintenance Code* as the Property Maintenance Code of the City of Boulder. This chapter establishes minimum code standards related to: administration; definitions; general requirements; light, ventilation and occupancy limitations; plumbing facilities and fixture requirements; mechanical and electrical systems; fire safety requirements; and rental licensing; and existing residential rental structure energy conservation.

10-2-2. - Adoption of International Property Maintenance Code With Modifications.

(a) The 2018~~2012~~ edition of the *International Property Maintenance Code* (IPMC) of the International Code Council is hereby adopted by reference as the City of Boulder Property Maintenance Code and has the same force and effect as though fully set forth in this chapter, except as specifically amended for local application by this chapter.

(b) IPMC Appendix chapters A, "Boarding Standard," B, "Rental Housing Inspections," and C, "Energy Efficiency Requirement - Existing Residential Rental Structures Energy Conservation," are adopted.

(c) For ease of reference, the following identifies all chapters, sections and appendices of the published and adopted IPMC and includes specific amendments for local application. Chapter, Section, Subsection, or Appendix numbers of provisions not amended appear, followed by the words, "No changes." The amended text of specifically amended provisions appears below. Chapter, Section, Subsection, or Appendix numbers of any provisions not adopted appear, followed by the word, "Deleted."

CHAPTER 1
SCOPE AND ADMINISTRATION

PART 1 - SCOPE AND ADMINISTRATION

....

SECTION 102
APPLICABILITY

102.1 General. No changes.

102.2 Maintenance. Equipment, systems, devices, and safeguards required by this code shall be maintained in accordance with the code in effect when the structure or premises were legally constructed, altered, or repaired and shall be maintained in good working order.

102.3 Application of Other Codes. Repairs, additions, or alterations to a structure, inspections, or changes of occupancy shall be done in accordance with the procedures and provisions of the City of Boulder Building Code, City of Boulder Residential Code, City of Boulder Existing Building Code, City of Boulder Fuel Gas Code, City of Boulder Mechanical Code, City of Boulder Plumbing Code, City of Boulder Fire Code, City of Boulder Energy Conservation Code, and City of Boulder Electrical Code.

102.4—102.10 No changes.

PART 2 - ADMINISTRATION AND ENFORCEMENT

SECTION 103
DIVISION OF BUILDING SAFETY

....

103.2 Appointment. Deleted.

103.2 Deputies. Deleted.

....

103.5 Fees. The fees and costs for activities and services performed by the department in carrying out its responsibilities under this code shall be as detailed in ~~Section 111.9 of this code and~~ Section 4-20-47, "Zoning Adjustment and Building Appeals Filing Fees," B.R.C. 1981.

....

SECTION 107 \ NOTICES AND ORDERS

....

107.4 Unauthorized Tampering. No changes.

107.5 Penalties. Penalties for noncompliance with orders and notices shall be as set forth in Section 106.1.

107.6 Transfer of Ownership. Deleted.

....

SECTION 109
EMERGENCY MEASURES

109.1 Imminent danger. When in the opinion of the code official, there is imminent danger of failure or collapse of a building or structure that endangers life, or when any structure or part of a structure has fallen and life is endangered by the occupation of the structure, or when there is actual or potential danger to the building occupants or those in the proximity of any structure because of explosives, explosive fumes or vapors or the presence of toxic fumes, gases or materials, or operation of defective or dangerous equipment, the code official is hereby authorized and empowered to order and require the occupants to vacate the premises forthwith. The code official shall cause to be posted at each entrance to such structure a notice bearing the words "Unsafe, Do Not Enter". It shall be unlawful for any person to enter such structure, except with the prior approval of the building official, for the purpose of securing the structure, making the required repairs, removing the hazardous condition or of demolishing the same.

~~109.2~~ ~~109.1~~—109.6 No changes.

SECTION 110
DEMOLITION

110.1—110.4 No changes.

SECTION 111
MEANS OF APPEAL

....

~~111.9 Fees. Deleted.~~

....

CHAPTER 3
GENERAL REQUIREMENTS

....

SECTION 304
EXTERIOR STRUCTURE

....

304.7 Roofs and Drainage. The roof and flashing shall be sound, tight and not have defects that admit water~~rain~~. Roof drainage shall be adequate to prevent dampness or deterioration in the walls or interior portion of the structure. Roof drains, gutters and downspouts shall be maintained in good repair and free from obstructions. Roof water shall not be discharged in a manner that creates a public nuisance.

....

304.19 Gates. No changes.

SECTION 305
INTERIOR STRUCTURE

305.1 General. No changes.

305.1.1 Unsafe Conditions. The following conditions shall be determined as unsafe and shall be repaired or replaced to comply with the City of Boulder Residential ~~Building~~ Code or the City of Boulder Existing ~~International~~ Building Code as required for existing buildings:

....

SECTION 306
COMPONENT SERVICEABILITY

306.1 ~~& 306.1.1~~ No changes.

306.1.1 Unsafe Conditions. Where any of the following conditions cause the component or system to be beyond its limit state, the component or system shall be determined as unsafe and shall be repaired or replaced to comply with the City of Boulder Residential Code or the City of Boulder Existing Building Code as required for existing buildings:

1. Soils that have been subjected to any of the following conditions:
   1.1. Collapse of footing or foundation system.
   1.2. Damage to footing, foundation, concrete or other structural element due to soil expansion.
   1.3. Adverse effects to the design strength of footing, foundation, concrete or other structural element due to a chemical reaction from the soil.
   1.4. Inadequate soil as determined by a geotechnical investigation.
   1.5. Where the allowable bearing capacity of the soil is in doubt.

1.6. Adverse effects to the footing, foundation, concrete or other structural element due to the ground water table.

2. Concrete that has been subjected to any of the following conditions:

2.1 *Deterioration.*

2.2. *Ultimate deformation.*

2.3. Fractures.

2.4. Fissures.

2.5. Spalling.

2.6. Exposed reinforcement.

2.7. *Detached*, dislodged or failing connections.

3. Aluminum that has been subjected to any of the following conditions:

3.1. *Deterioration.*

3.2. Corrosion.

3.3. Elastic deformation.

3.4. *Ultimate deformation.*

3.5. Stress or strain cracks.

3.6. Joint fatigue.

3.7. *Detached*, dislodged or failing connections.

4. Masonry that has been subjected to any of the following conditions:

4.1. *Deterioration.*

4.2. *Ultimate deformation.*

4.3. Fractures in masonry or mortar joints.

4.4. Fissures in masonry or mortar joints.

4.5. Spalling.

4.6. Exposed reinforcement.

4.7. *Detached*, dislodged or failing connections.

5. Steel that has been subjected to any of the following conditions:

5.1. *Deterioration.*

5.2. Elastic deformation.

5.3. *Ultimate deformation.*

5.4. Metal fatigue.

5.5. *Detached*, dislodged or failing connections.

6. Wood that has been subjected to any of the following conditions:

6.1 Ultimate deformation.

6.2. Deterioration.

6.3. Damage from insects, rodents and other vermin.

6.4. Fire damage beyond charring.

6.5. Significant splits and checks.

6.6. Horizontal shear cracks.

6.7. Vertical shear cracks.

6.8. Inadequate support.

6.9. Detached, dislodged or failing connections.

6.10. Excessive cutting and notching.

Exceptions:

1. Where substantiated otherwise by an *approved* method.

2. Demolition of unsafe conditions shall be permitted where *approved* by the *code official*

....

CHAPTER 6
MECHANICAL AND ELECTRICAL REQUIREMENTS

....

SECTION 605
ELECTRICAL EQUIPMENT

....

605.3 Luminaires. No changes~~Deleted~~

....

SECTION 607
DUCT SYSTEMS

607.1 General. No changes.

~~SECTION 608~~
~~CARBON MONOXIDE ALARMS~~

~~**608.1 General.** Carbon monoxide alarms shall be installed in existing residential structures in accordance with Colorado state law, including Title 38, Article 45, Carbon Monoxide Alarms, C.R.S.~~

~~**608.2 Carbon Monoxide Alarms.** Carbon monoxide alarms shall be installed in existing dwellings and rented single and multi-family dwellings that have fuel-fired heaters, appliances, or fireplaces, or attached garages based on the following:~~

~~1. Alarms must be installed within 15' of the entrance to each sleeping area and must be wired to AC power, connected to an electrical panel, plugged into an electrical outlet without a switch or, if battery operated, attached to the wall or ceiling per the manufacturer's installation instructions and in accordance with National Fire Protection Association 70.~~

~~2. Alarms must be installed in existing rental dwellings upon change of tenant occupancy after July 1, 2009.~~

~~3. Alarms must be installed in all newly constructed or renovated single-family and multi-family rental units.~~

~~4. Alarms may be installed within 25' of any fuel-fired heater or appliance, fireplace, or garage entrance in a multi-family dwelling used for rental purposes ONLY if the multi-family dwelling is equipped with a centralized alarm system or other mechanism that allows a responsible person to hear the alarm at all times (commercially monitored system).~~

~~5. Rental owners are responsible for replacing nonfunctioning carbon monoxide alarms upon written request of the tenant or when the unit is being vacated and rerented.~~

~~6. Carbon monoxide detectors shall not be disarmed, removed or have the batteries removed to make them inoperable.~~

~~**608.3 Carbon Monoxide Alarm Inspections.** Carbon monoxide alarm inspections shall be conducted by the property owner or agent as detailed below.~~

~~1. Carbon monoxide alarms that receive their primary power from the building wiring shall be checked for good operating condition once each year and supplied with battery backup. The battery shall be replaced as necessary for proper function of the carbon monoxide alarm.~~

~~2. Battery-powered carbon monoxide alarms shall be tested for proper function on an annual basis. Batteries shall be replaced as necessary for proper function of the carbon monoxide alarm.~~

CHAPTER 7
FIRE SAFETY REQUIREMENTS

SECTIONS 701—703

No changes.

SECTION 704
FIRE PROTECTION SYSTEMS

704.1-704.7 No Changes.

704.8 Smoke Alarm Inspections. Smoke alarm inspections shall be conducted by the property owner or agent as detailed below.

1. Smoke alarms that receive their primary power from the building wiring shall be checked for good operating condition once each year and if supplied with battery backup, the battery shall be replaced as necessary for proper function of the smoke alarm.

2. Battery-powered smoke alarms shall be tested for proper function on an annual basis. Batteries shall be replaced as necessary for proper function of the smoke alarm.

704.9 Residential Rental Smoke Alarms. In R-occupancies governed by Chapter 10-3, "Rental Licenses," B.R.C. 1981, smoke alarms shall be installed and inspected as required in this section.

704.10 Fire Alarms. Fire alarms in existing residential structures shall be installed in accordance with Chapter 10-8, Section 907.3, "Fire Code," B.R.C. 1981.

~~**704.1—704.4** No changes.~~

~~**704.5 Residential Rental Smoke Alarms.** In R-occupancies governed by Chapter 10-3, "Rental Licenses," B.R.C. 1981, smoke alarms shall be installed and inspected as required in this section.~~

~~**704.6 Smoke Alarm Inspections.** Smoke alarm inspections shall be conducted by the property owner or agent as detailed below.~~

~~1. Smoke alarms that receive their primary power from the building wiring shall be checked for good operating condition once each year and if supplied with battery backup, the battery shall be replaced as necessary for proper function of~~

~~the smoke alarm.~~

~~2. Battery-powered smoke alarms shall be tested for proper function on an annual basis. Batteries shall be replaced as necessary for proper function of the smoke alarm.~~

~~**704.7 Fire Alarms.** Fire alarms in existing residential structures shall be installed in accordance with Chapter 10-8, Section 907.3, "Fire Code," B.R.C. 1981.~~

SECTION 705
CARBON MONOXIDE ALARMS

705.1 – 705.2 No changes.

705.3 General. Carbon monoxide alarms shall be installed in existing residential structures in accordance with Colorado state law, including Title 38, Article 45, Carbon Monoxide Alarms, C.R.S.

705.4 Carbon Monoxide Alarms. Carbon monoxide alarms shall be installed in existing dwellings and rented single and multi-family dwellings that have fuel fired heaters, appliances, or fireplaces, or attached garages based on the following:

1. Alarms must be installed within 15' of the entrance to each sleeping area and must be wired to AC power, connected to an electrical panel, plugged into an electrical outlet without a switch or, if battery operated, attached to the wall or ceiling per the manufacturer's installation instructions and in accordance with National Fire Protection Association 70.
2. Alarms must be installed in existing rental dwellings upon change of tenant occupancy after July 1, 2009.
3. Alarms must be installed in all newly constructed or renovated single-family and multi-family rental units.
4. Alarms may be installed within 25' of any fuel-fired heater or appliance, fireplace, or garage entrance in a multi-family dwelling used for rental purposes ONLY if the multi-family dwelling is equipped with a centralized alarm system or other mechanism that allows a responsible person to hear the alarm at all times (commercially monitored system).
5. Rental owners are responsible for replacing nonfunctioning carbon monoxide alarms upon written request of the tenant or when the unit is being vacated and rerented.
6. Carbon monoxide detectors shall not be disarmed, removed or have the batteries removed to make them inoperable.

705.5 Carbon Monoxide Alarm Inspections. Carbon monoxide alarm inspections shall be conducted by the property owner or agent as detailed below.

1. Carbon monoxide alarms that receive their primary power from the building wiring shall be checked for good operating condition once each year and supplied with battery backup. The battery shall be replaced as necessary for proper function of the carbon monoxide alarm.

2. Battery-powered carbon monoxide alarms shall be tested for proper function on an annual basis. Batteries shall be replaced as necessary for proper function of the carbon monoxide alarm.

SECTION 706~~705~~
PORTABLE FIRE EXTINGUISHERS

706.1~~705.1~~ Where Required. Portable fire extinguishers shall be installed as required by the City of Boulder Fire Code Section 906.

706.1.1~~705.1.1~~ In new and existing R-1, R-2 and R-4 occupancies, portable fire extinguishers need only be installed when interior corridors and common areas exist in accordance with Section 906.1 and table 906.3(2) for light (low) hazard occupancies and sections 906.3 through 906.9.

APPENDIX A
BOARDING STANDARD

A101—A104~~A103~~ No changes.

APPENDIX B
RENTAL HOUSING INSPECTION AND LICENSING

B101 Scope. Appendix B sets standards for administering the rental housing maintenance, inspection and licensing process.

B102 Rental Licenses. Residential rental licenses are applied for and renewed in accordance with Chapter 10-3, "Rental Licenses," B.R.C. 1981.

B103 Inspections. Rental inspections~~"Baseline" and "Renewal inspections"~~ shall be performed and certified by licensed contractors as detailed in Chapter 4-4, "Building Contractor License," B.R.C. 1981.

....

Section 3. Chapter 10-3, "Rental Licenses," B.R.C. 1981, is amended as follows:

....

10-3-3. - Terms of Licenses.

....

(b) In addition to any other applicable requirements, new licenses and renewals shall require that the licensee submit to the city manager a complete application packet for the license, on forms provided by the manager. The application shall satisfy the following requirements:

(1) A current rental~~baseline~~ inspection report (for a new license except as set forth in Section 10-3-5, "License Procedure for Newly Constructed Rental Property," B.R.C.

1981,) ~~or a current renewal inspection report executed by a rental housing inspector~~ certifying compliance with those portions of Chapter 10-2, "Property Maintenance Code," and Section 9-9-16, "Lighting, Outdoor," B.R.C. 1981, for which the report form requires inspection and certification.

(2) The operator shall certify on the application forms provided by the manager that the operator has a current valid contract with a commercial trash hauler for removal of accumulated trash from the licensed property in accordance with Subsection 6-3-3(b), B.R.C. 1981.

(c) The city manager shall issue separate licenses for individual buildings. Such licenses shall cover all dwelling units and rooming units within such buildings. In a building containing attached but individually owned dwelling units, or any other dwelling units which may be separately conveyed, the city manager shall issue separate licenses for each dwelling unit. A structure, or group of structures, shall be considered to be a single building if it has been assigned a single street address by the City. If a complex of buildings on one property is under common ownership, and this owner is willing to have a common expiration date for the licenses for all dwelling and rooming units, the city manager may consider the whole complex to be the equivalent of a single building for the purposes of licensing and the fee schedule in Section 4-20-18, "Rental License Fee," B.R.C. 1981.

(d) Whenever an existing license is renewed, the renewal license shall be effective from the date of expiration of the last license if the applicant submits a complete renewal application by or within ninety days from the expiration date. ~~Licenses not renewed within ninety days will be considered expired, requiring a new baseline inspection report.~~

(e) Issuance of any license (new or renewed) extending beyond December 31, 2018 requires meeting the energy efficiency requirements of Chapter 10-2, "Property Maintenance Code, Appendix C - Energy Efficiency Requirements," B.R.C. 1981.

....

10-3-6. - License Application Procedure for Buildings Converted to Rental Property.

Every operator converting a property to rental property shall follow the procedures in this section for procuring a rental license:

(a) Submit to the city manager a complete application packet, on forms provided by the manager, at least thirty days before rental of the property including:

(1) A rental housing inspector's certification of rental~~baseline~~ inspection dated within twelve months before the application. The operator shall make a copy of the inspection form available to city staff and tenants of inspected units within fourteen days of a request;

(2) The rental housing inspector shall certify in the rental~~baseline~~ inspection report the condition and location of all smoke and carbon monoxide alarms required by Chapter 10-2, "Property Maintenance Code," B.R.C. 1981;

(3) A trash removal plan meeting the requirements of Subsection 6-3-3(b), B.R.C. 1981, made and verified by the operator; and

(4) If the unit is an affordable accessory unit as defined in Section 9-16-1, "Definitions," B.R.C. 1981, a sworn certification that the unit will meet the rental affordability standard as defined in Section 9-16-1, "Definitions," B.R.C. 1981.

(b) Pay all license fees prescribed by Section 4-20-18, "Rental License Fee," B.R.C. 1981, ~~at the time of submitting the license application~~. The city manager shall not issue any rental license if the operator owes any fees or penalties, unless the penalties are subject to a pending appeal.

(c) Take all reasonable steps to notify any occupants of the property in advance of the date and time of the inspection. The operator shall be present and accompany the inspector throughout the inspection, unlocking and opening doors as required.

10-3-7. - License Renewal Procedure for Buildings Occupied as Rental Property.

Every operator of a rental property shall follow the procedures in this section when renewing an unexpired license:

(a) Submit to the city manager a complete application packet, on forms provided by the manager including:

(1) A rental housing inspector's certification of rental ~~renewal~~ inspection dated within twelve months before the application. The operator shall make a copy of the inspection form available to city staff and tenants of inspected units within fourteen days of a request;

(2) The rental housing inspector shall certify in the rental~~baseline~~ inspection report the condition and location of all smoke and carbon monoxide alarms required by Chapter 10-2, "Property Maintenance Code," B.R.C. 1981;

....

10-3-12. - License Fees.

(a) Applicants for any rental housing license, and operators renewing an existing rental housing license, shall pay the license fees prescribed by Section 4-20-18, "Rental License Fee," B.R.C. 1981, prior to issuance~~upon submission~~ of any license application.

....

10-3-14. - Local Agent Required.

Whenever any rental property is required to be licensed under this chapter, and neither the owner nor the operator is a natural person domiciled within Boulder County, Colorado, the owner shall appoint a natural person who is capable of responding to the property within sixty minutes~~domiciled within Boulder County, Colorado~~, to serve as the local agent of the owner and the operator for service of such notices as are specified in Section 10-2-2, "Property Maintenance Code," Section 108, "Unsafe Structures and Equipment," and Section 109, "Emergency Measures," B.R.C 1981, and notices given to the local agent shall be sufficient to satisfy any requirement of notice to the owner or the operator. The owner shall notify the city manager in writing of the appointment within five days of being required to make such an appointment, and shall thereafter notify the city manager of any change of local agent within fifteen days of such change.

....

Section 4. Chapter 10-5, "Building Code," B.R.C. 1981, is amended as follows:

10-5-1. - Legislative Intent.

The purpose of this chapter is to protect the public health and safety by regulating the construction, alteration, repair, wrecking, and moving of structures in the city. The city council hereby adopts the 20182~~012~~ edition of the *International Building Code* with certain amendments and deletions thereto found to be in the best interests of the residents of the city.

10-5-2. - Adoption of International Building Code With Modifications.

(a) The 20182~~012~~ edition of the *International Building Code* of the International Code Council is hereby adopted by reference as the City of Boulder Building Code and has the same force and effect as though fully set forth in this chapter, except as specifically amended by the provisions of this chapter.

(b) The appendix chapters I, "PATIO COVERS," J, "GRADING," and K, "ADMINISTRATIVE PROVISIONS," and sections contained therein are adopted.

(c) Section 101.1, "Title," is repealed and reenacted to read:

101.1 Title. These regulations shall be known as the Building Code of the City of Boulder or building code, hereinafter referred to as "this code." Where other codes are referenced in this code, those code provisions shall not apply unless otherwise adopted by the City of Boulder. Where reference is made anywhere in this code to the "Department" or "Department of Building Safety," it shall have the same meaning as the "Division of Building Safety." Where reference is made anywhere in this code to the "International Energy Conservation Code," it shall have the same meaning as the "City of Boulder Energy Conservation Code."

(d) Section 101.4, "Referenced codes," is repealed and reenacted to read:

Chapter 1, "Administration," in this code shall also apply and serve as Chapter 1, "Administration," in the following codes ~~adopted by reference in this title~~: Chapter 10-2, "International Property Maintenance Code"; Chapter 10-5.5, "International Residential Code"; Chapter 10-5.6, "International Existing Building Code"; Chapter 10-7, "City of Boulder Energy Conservation Code"; Chapter 10-8.5, "International Wildland-Urban Interface Code", Chapter 10-9, "International Mechanical Code"; Chapter 10-9.5, "International Fuel Gas Code"; ~~and~~ Chapter 10-10, "International Plumbing Code," B.R.C. 1981. Where administrative provisions are expressly adopted, or adopted in an altered form, for use in those chapters, they shall supersede any conflicting provisions of the administrative provisions of this chapter.

The other codes listed in Sections 101.4.1 through 101.4.7~~101.4.6~~ and referenced elsewhere in this code shall be considered as part of the requirements of this code as applicable.

....

(j) Section 105.2, "Work exempt from permit," is repealed and reenacted to read:

105.2 Work exempt from permit. Exemptions from the building permit requirements of this code do not grant authorization for any work to be done in violation of the requirements of this code or any other laws or ordinances of the City. Building permits shall not be required for the following:

General:

1. One-story detached nonconditioned buildings accessory to a residential structure and not more than 80 square feet in area or ten feet in height and not being served by any electrical, mechanical, or plumbing fixtures or systems.
2. Fences not over ~~7six~~ feet (2,134 mm) high.

....

(n) Section 107.1, "General," is repealed and reenacted to read:

107.1 General. An applicant for a building permit shall submit a minimum of two sets of plans and specifications with each application when required by the building official for enforcement of any provisions of this code.

....

(2) Drawings and specifications for footings and foundations shall bear the seal and signature of a professional engineer ~~or architect~~ registered in Colorado or an architect licensed in Colorado and be designed as specified in Chapter 18 of the building code for all occupancies.

Exceptions:

(a) Detached structures not intended for human occupancy;

(b) Additions to existing detached dwellings not exceeding 150 square feet.

....

(q) Section 113, "Board of Appeals," is repealed and reenacted to read:

113 Appeals and advisory opinions.

....

(g) The board or hearing officer has no authority to interpret Chapter 1 (the administrative requirements) ~~and Chapter 34~~ of this code except as expressly provided in this section, nor, because this code sets minimum standards, to waive any requirement of this code.

....

(s) Section 202, "Definitions," is amended by the addition of the following new definitions:

MULTIPLE FIXTURE ALL GENDER TOILET FACILITY. A toilet facility consisting of multiple water closet compartments and associated lavatories which serve all genders.

PERMIT ISSUANCE. The date that the approved building permit is paid for and received back from the city manager by the applicant or a representative of the applicant.

(y) A new Subsection 6 is added to Section 708.1, "General," to read:

6. Walls separating marijuana growing, processing, and dispensing occupancies from adjacent occupancies.

(z) A paragraph is added to Section (F) 903.2, "Where required," to read:

The maximum fire area without an automatic sprinkler system shall be determined by Section 903.2 of the fire code.

(aa) Section 907.2.10~~907.2.11~~, "Single- and multiple-station smoke alarms," is amended by the addition of the following subsections:

907.2.10.8~~907.2.11.5~~ Alterations, repairs, and enlargements. (1) When buildings or structures, or portions of buildings or structures, classified as Group R are altered, repaired, or enlarged and the work requires a building permit, or (2) when one or more sleeping rooms are added or created, smoke alarms shall be installed for each dwelling or sleeping unit affected by such work in accordance with Section 907.2.10~~907.2.11~~, except as provided otherwise in this section or its subsections.

Exceptions:

1. Work involving solely the exterior surfaces of the building or structure, such as replacement of roofing or siding or the addition of a porch or deck.
2. Installation, alterations, and repairs of plumbing or mechanical systems.

907.2.10.8.1~~907.2.11.5.1~~ Exception to interconnection. Section 907.2.10.5~~907.2.11.3~~ applies except that interconnection of smoke alarms in existing areas shall not be required where alterations and repairs do not include removal of interior wall and ceiling finishes exposing the structure unless an attic, crawlspace, or basement is available to provide access for interconnection without removal of interior finishes.

907.2.10.8.2~~907.2.11.5.2~~ Exception to power source. Section 907.2.10.6~~907.2.11.4~~ applies except that (1) smoke alarms may be battery-operated when installed in a building without commercial power and (2) hard-wired smoke alarms shall not be required in existing areas where alterations or repairs do not result in the removal of interior wall and ceiling finishes exposing the structure unless an attic, crawlspace, or basement is available to provide access for hard wiring without removal of interior finishes.

(**) **Section 1109.2.2, "Water closet compartment,"** is repealed and reenacted to read:

1109.2.2 Water closet compartment. Where water closet compartments are provided in a toilet room or bathing room, at least one wheelchair-accessible compartment shall be provided. Where the combined total water closet compartments and urinals provided in a toilet room or bathing room is eleven or more, at least one ambulatory-accessible water closet compartment shall be provided in addition to the wheelchair-accessible compartment.

(bb) Section 1404.31405.3, "Vapor retarders," is amended by adding two exceptions:

4. Commercial and multiple-residence buildings complying with the *2020 City of Boulder~~2012 International~~ Energy Conservation Code* Section C402.5~~C402.4~~, Air leakage (mandatory).

5. Residential buildings complying with the *2020 City of Boulder~~2012 International~~ Energy Conservation Code* Section R402.4, Air leakage (mandatory).

(cc) Section 1505.1, "General," is repealed and reenacted to read:

1505.1 General. All roof assemblies and roof coverings required to be listed by this section shall be tested in accordance with ASTM Standard E 108 or UL Standard 790. Class A roofs and the exceptions noted in Section 1505.3 for class B roofs as described in this Chapter 15 are the only roof assemblies and roof coverings allowed to be installed on any new or existing building within the city of Boulder. Wood shakes, wood shingles, and wood roof covering materials are prohibited except as provided in Section 10-5-5, "Wood Roof Covering Materials Prohibited," B.R.C. 1981, for certain minimal repairs.

~~(dd) Section 1608.1, "General," is repealed and reenacted to read:~~

~~**1608.1 General.** The minimum roof snow load shall be thirty pounds per square foot, but the design roof load shall not be less than that determined by Section 1607.~~

(ee) Section 1608.2, "Ground snow loads," is ~~deleted~~repealed and reenacted to read:

Ground snow loads shall be 40 pounds per square foot, $P_g = 40$ lb/ft^2

(ff) Section 1609.3, "Basic wind speed," is amended by adding the following sentence:~~but not Section 1609.3.1 and Table 1609.3.1, is repealed and reenacted to read:~~

~~**1609.3 Basic wind speed.**~~

The ~~basic~~ultimate design wind speed, V_{ult}, in mph, for the determination of wind loads shall be determined by Table 1609.3, based on the wind zone and building risk category ~~I~~II.

TABLE 1609.3 *
BASIC~~ULTIMATE~~ DESIGN WIND SPEED

Basic~~Ultimate~~ Design Wind Speed $(V)_{ult}$, in MPH according to Wind Zone and Building Risk Category			
Wind Zone	**Risk Category I**	**Risk Category II**	**Risk Category III and ~~IV~~IV**
East of Broadway	**140**	**150**	**160**
West of Broadway	**155**	**165**	**175**

* These standards were developed by Jon A. Peterka in the Colorado Front Range Gust Map—

ASCE 7-167-10 Compatible dated November 18, 2013.

(gg) Sections 1612.2, 1612.3 and 1612.41612.3, 1612.4 and 1612.5 are repealed.

(hh) Section 1705, "Required Special Inspections and Testsverification and inspection," is amended by adding the following subsection:

1705.191705.18 Special inspection for medical gas systems. Medical gas systems shall be tested as detailed in Chapter 12, "Special Piping and Storage Systems," of the City of Boulder Plumbing Code.

(**) A new exception 5 is added to Section 2902.2, **Separate Facilities**:

5. Separate facilities are not required when multiple fixture all gender facilities are provided. Multiple fixture all gender facilities are not required; they are an alternative to be determined by the property owner or the owners' agent.

(**) 2902.4 "Signage", is repealed and reenacted to read:

2902.4 Signage. Required public facilities shall be provided with signs that designate which genders the facility accommodates as required by section 2902.2. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1111.

Exception: Toilet facilities with only one water closet shall not be identified for exclusive use by any gender and shall be deemed to meet the requirements of this section. Signage shall be provided in accordance with Section 2902.4.2.

2902.4.1 Directional signage. Directional signage indicating the route to the required public toilet facilities shall be posted in a lobby, corridor, aisle or similar space, such that the sign can be readily seen from the main entrance to the building or tenant space.

2902.4.2 All gender signage. Single-user toilet facilities provided in accordance with Section 2902.1.2, and family or assisted-use toilet facilities provided in accordance with Section 2902.2.1, shall be provided with signs which clearly indicate the facilities are available for use by all genders.

2902.4.2.1 Existing facilities. After December 31, 2020, all existing single-user toilet facilities and family or assisted-use toilet facilities, shall be provided with signage in accordance with Section 2902.4.2.

(ii) Section J103, "Permits required," of Appendix J, "GRADING," is amended by adding the following subsections:

....

(**) A new Chapter 36 is added to read:

CHAPTER 36. COMMERCIAL CONSTRUCTION WASTE RECYCLING.

3601.1 Commercial construction recycling requirement.
An applicant for a building permit to construct a new building shall demonstrate all recyclable wood, metal and cardboard materials were donated, reused or recycled.

3601.1.1 Reporting.
Within sixty days following the completion of the project and prior to final inspection, the applicant shall submit documentation to the city manager which proves that all recyclable wood, metal and cardboard was donated, reused, or recycled. The documentation shall consist of a final completed waste diversion report in a form as prescribed by the city manager showing the tonnage of materials salvaged for recycling and reuse, supported by original weight receipts or other waste documentation that reasonably verifies that materials generated from the site have been accepted for recycling, reuse, salvage or otherwise diverted. For construction debris for which weighing is not practical due to size, lack of scales at the facility, or other considerations, a volumetric measurement shall be used. For conversion of volumetric measurements to weight, the applicant shall use the standardized conversion rates established by the city manager.

3601.2 Commercial deconstruction waste recycling.
An applicant for a full demolition shall adhere to the requirements of 3601.2.1 through 3601.2.3.

3601.2.1 Diversion requirements.
The applicant shall divert from landfills at least seventy-five percent of the waste tonnage of demolition debris generated from the project by using recycling, reuse, and diversion programs. The city manager may modify this requirement if the applicant demonstrates it is unfeasible as set forth in section 3601.2.2. The materials diverted must also include at least three of the material types set forth in the in the deconstruction plan form established by the city manager.

3601.2.2 Information required before issuance of demolition permit.
The applicant shall submit a properly completed deconstruction plan in a form as established by the city manager. The applicant must propose to divert at least three of the material types identified by the city manager in the deconstruction plan form. No building permit or demolition permit shall be issued prior to the approval of the deconstruction plan by the city manager. In estimating the volume or weight of materials identified in the deconstruction plan, the applicant shall use the standardized conversion rates established by the city manager. The city manager may modify the required diversion percentage if the applicant demonstrates in the deconstruction plan that the percentage is not feasible because the maximum weight of materials that can be reused or recycled is less than the required diversion rate, or due to the presence of materials that are unable to be diverted due to special waste conditions such as environmental hazards.

3601.2.3 Administrative fee and deposit required.
Prior to issuance of a permit for a full demolition or level 4 alteration as defined in the *2020 City of Boulder Energy Conservation Code*, the applicant shall post a cash deposit and pay the administrative fee described in Section 4-20-72, B.R.C. 1981. The cash deposit shall be one dollar per square foot of the demolition or work area of the alteration as identified in the permit application, or $1,500, whichever is greater.

3601.2.4 Reporting.
Within sixty days following the completion of the demolition, the applicant shall submit documentation to the city which proves compliance with the requirements of sections 3601.2.1 and 3601.2.2. The documentation shall consist of a final completed waste diversion report in a form established by the city manager showing the tonnage of materials salvaged for recycling and reuse, supported by original weight receipts or other waste documentation that reasonably verifies that materials generated from the site have been accepted for recycling, reuse, salvage or otherwise diverted at the required diversion percentage. The documentation shall further demonstrate that the diverted materials include at least three material types. For demolition debris for which weighing is not practical due to size, lack of scales at facility, or other considerations, a volumetric measurement shall be used. For conversion of volumetric measurements to weight, the applicant shall use the standardized conversion rates established by the city manager.

3601.2.5 Deposit refunded or forfeited.
No applicant shall fail to comply with 3601.2.1 through 3601.2.4. The deposit shall be refunded to the applicant in proportion to the ratio of the actual diversion rate to the required diversion rate. If the required diversion percentage is not fully complied with, the remainder of the deposit shall be forfeited to the city as a civil penalty for failure to comply with the requirements of this chapter, after notice and an opportunity for hearing under the procedures prescribed by Chapter 1-3, "Quasi-Judicial Hearings," B.R.C. 1981. The city manager may adjust the amount of the refund or forfeiture where the applicant demonstrates that the required diversion percentage was not feasible based on the factors identified in 3601.2.2 for modification of the diversion percentage. The forfeiture remedy is cumulative and is in addition to any other action the city manager is authorized to take, including suspension or revocation of a building contractor license or prosecution in the municipal court. Each 2,500 square feet of the demolition or alteration shall give rise to a separate violation, and each violation is subject to a maximum fine of $2,500.

....

Section 5. Chapter 10-5.5, "Residential Building Code," B.R.C. 1981, is amended as follows:

10-5.5-1. - Legislative Intent.

The purpose of this chapter is to protect the public health, safety, and general welfare by regulating the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal, and demolition of detached one- and two-family dwellings and townhouses, not more than three stories above grade in height with a separate means of egress, and their accessory structures. The city council hereby adopts the 20182~~012~~ edition of the *International Residential Code* with certain amendments thereto found to be in the best interests of the city.

10-5.5-2. - Adoption of the International Residential Code With Modifications.

(a) The 20182~~012~~ edition of the International Residential Code of the International Code Council is hereby adopted by reference as the City of Boulder Residential Building Code

and has the same force and effect as though fully set forth in this chapter, except as specifically amended by the provisions of this chapter.

(b) The Appendix chapters D, E, F, ~~G,~~ H, J, K, ~~and~~ P, Q, R and S and sections contained therein are adopted.

....

(f) A new sentence is added to the end of Section R301.1, "Application," stating:

Structural calculations shall be submitted to the building official, demonstrating ~~how~~ the proposed construction meets the applicable requirements for design loads ~~supports must be provided to the building official~~.

(g) The climatic and geographic design criteria applicable to Table R301.2(1) are:

Ground ~~s~~Snow ~~l~~Load = ~~thirty~~ 40 pounds per square foot, P_g = 40 lb/ft^2 ~~with a minimum Roof Snow Load of 30 pounds per square foot~~.

Three-second wind gust velocity = 150~~120~~ mph east of Broadway, 165~~130~~ mph west of Broadway

Topographic effects = Yes
Special wind region = Yes
Windborne debris zone = No
Seismic Design Category = B
Weathering = severe
Frost line depth = 32 inches
Termite = slight
Decay = none to slight
Winter Design Temp = 2 degrees Fahrenheit
Ice barrier underlayment required = NO
Flood Hazards = See Sections 9-3-3 through 9-3-9, B.R.C. 1981
Air freezing index = 459
Mean annual temp = 52.1
Elevation = 5385 feet
Latitude = 40 degrees
Winter Heating = 0 degrees Fahrenheit
Summer Cooling = 91 degrees Fahrenheit
Altitude Correction Factor= 0.821
Indoor Design Temperature = 72 degrees Fahrenheit
Design Temperature Cooling = 75 degrees Fahrenheit
Heating Temperature difference = 66 degrees Fahrenheit
Cooling Temperature difference = 18 degrees Fahrenheit
Wind Velocity Heating = 15
Wind Velocity Cooling = 7.5
Coincident Wet Bulb = 59 degrees Fahrenheit
Daily Range = High
Winter Humidity = 30%

Summer Humidity = 50%

(h) Section R301.2.4, "Floodplain construction": A new sentence is added to the end of the section reading "All work on structures in the scope of this code shall also meet the requirements of Sections 9-3-29 3-3 through 9-3-9, B.R.C 1981."

....

(j) The first sentence of the Exception to Item 2 in Section R302.2.4R302.2.2, "Parapets for townhouses," is amended by deleting "a minimum class C roof covering" and replacing it with "a minimum Class B roof covering."

(k) Section R302.5.1, "Opening protection," is repealed and reenacted to read:

R302.5.1 Opening protection. Openings from a garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with weather-stripped, solid wood doors not less than 1 and 3/8 inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than 1 and 3/8 inches (35 mm) in thickness, or 20-minute fire-rated doors, equipped with a self-closing device.

~~(l) Section R309.5, "Fire sprinklers," is deleted.~~

(m) Section R311.2, "Egress doors," is repealed and reenacted to read:

R311.2 Egress doors. At least one egress door shall be provided for each dwelling unit. The egress door shall be side hinged, and shall provide a minimum clear width of 32 inches (813 mm) when measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The minimum clear height of the door opening shall not be less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop.

....

~~(p) Section R313.1, "Townhouse automatic fire sprinkler systems," is repealed and reenacted to read:~~

~~**R313.1 Townhouse automatic fire sprinkler systems.** Automatic fire sprinkler systems shall be installed in townhouses in accordance with the requirements of Section 903.2.8 of the City of Boulder Fire Code.~~

~~(q) Section R313.2, "One- and two-family dwelling automatic fire sprinkler systems," is repealed and reenacted to read:~~

~~**R313.2 One- and two-family dwelling automatic fire sprinkler systems.** Automatic sprinkler systems shall be installed in one- and two-family dwellings in accordance with the requirements of Section 903.2.8 of the City of Boulder Fire Code.~~

.....

~~(l) A new Section R324 Construction Waste Management is added to read~~

~~**SECTION R324 CONSTRUCTION WASTE MANAGEMENT**~~

~~**R324.1 Construction Waste Recycling.** An applicant for a building permit for a new dwelling unit or an addition to an existing dwelling unit shall demonstrate all recyclable wood, metal, and cardboard materials will be donated, reused, or recycled.~~

~~**R324.2 Deconstruction Management.** An applicant proposing to demolish more than 50 percent of exterior walls shall demonstrate through a deconstruction plan that 100 percent of concrete and asphalt and at least 65 percent of other the existing building materials, by weight, from the deconstruction, excluding concrete and asphalt, will be diverted from the landfill for reuse or recycling.~~

A new Section R328, Construction Waste Management, is added to read:

SECTION R328 CONSTRUCTION WASTE MANAGEMENT

R328.1 Residential construction waste recycling. An applicant for a building permit to construct a new dwelling unit shall demonstrate all recyclable wood, metal and cardboard materials were donated, reused or recycled.

R328.1.1 Reporting. Within sixty days following the completion of the project and prior to final inspection, the applicant shall submit documentation to the city manager which proves that all recyclable wood, metal and cardboard was donated, reused, or recycled. The documentation shall consist of a final completed waste diversion report in a form as prescribed by the city manager showing the tonnage of materials salvaged for recycling and reuse, supported by original weight receipts or other waste documentation that reasonably verifies that materials generated from the site have been accepted for recycling, reuse, salvage or otherwise diverted. For construction debris for which weighing is not practical due to size, lack of scales at the facility, or other considerations, a volumetric measurement shall be used. For conversion of volumetric measurements to weight, the applicant shall use the standardized conversion rates established by the city manager.

R328.2 Residential deconstruction waste recycling. An applicant for a full demolition or level 4 alteration as defined in the *2020 City of Boulder Energy Conservation Code* shall adhere to the requirements of R328.2.1 through R328.2.5.

R328.2.1 Diversion requirements. The applicant shall divert from landfills at least seventy-five percent of the waste tonnage of demolition debris generated from the project by using recycling, reuse, and diversion programs. The city manager may modify this requirement if the applicant demonstrates it is unfeasible as set forth in section R328.2.2. The materials diverted must also include at least three of the material types set forth in the in the deconstruction plan form established by the city manager.

R328.2.2 Information required before issuance of demolition and/or building permit. The applicant shall submit a properly completed deconstruction plan in a form as established by the city manager. The applicant must propose to divert at least three of the material types identified by the city manager in the deconstruction plan form. No building permit or demolition permit shall be issued prior to the approval of the deconstruction plan by the city manager. In estimating the volume or weight of materials identified in the deconstruction plan, the applicant shall use the standardized conversion rates established by the city manager. The city manager may modify the required diversion percentage if the applicant demonstrates in the deconstruction plan that the percentage is not feasible because the maximum weight of materials that can be reused or recycled is less than the required diversion rate, or due to the presence of materials that are unable to be diverted due to

special waste conditions such as environmental hazards.

R328.2.3 Administrative fee and deposit required. Prior to issuance of a permit for a full demolition or level 4 alteration as defined in the *2020 City of Boulder Energy Conservation Code*, the applicant shall post a cash deposit and pay the administrative fee described in section 4-20-72, B.R.C. 1981. The cash deposit shall be one dollar per square foot of the demolition or work area of the alteration as identified in the permit application, or $1,500, whichever is greater.

R328.2.4 Reporting. Within sixty days following the completion of the demolition or alteration, the applicant shall submit documentation to the city which proves compliance with the requirements of sections R328.2.1 and R328.2.2. The documentation shall consist of a final completed waste diversion report in a form established by the city manager showing the tonnage of materials salvaged for recycling and reuse, supported by original weight receipts or other waste documentation that reasonably verifies that materials generated from the site have been accepted for recycling, reuse, salvage or otherwise diverted at the required diversion percentage. The documentation shall further demonstrate that the diverted materials include at least three material types. For demolition debris for which weighing is not practical due to size, lack of scales at facility, or other considerations, a volumetric measurement shall be used. For conversion of volumetric measurements to weight, the applicant shall use the standardized conversion rates established by the city manager.

R328.2.5 Deposit refunded or forfeited. No applicant shall fail to comply with R328.2.1 through R328.2.4. The deposit shall be refunded to the applicant in proportion to the ratio of the actual diversion rate to the required diversion rate. If the required diversion percentage is not fully complied with, the remainder of the deposit shall be forfeited to the city as a civil penalty for failure to comply with the requirements of this chapter, after notice and an opportunity for hearing under the procedures prescribed by Chapter 1-3, "Quasi-Judicial Hearings," B.R.C. 1981. The city manager may adjust the amount of the refund or forfeiture where the applicant demonstrates that the required diversion percentage was not feasible based on the factors identified in R328.2.2 for modification of the diversion percentage. The forfeiture remedy is cumulative and is in addition to any other action the city manager is authorized to take, including suspension or revocation of a building contractor license or prosecution in the municipal court. Each 2500 square feet of the demolition or alteration shall give rise to a separate violation, and each violation is subject to a maximum fine of $2,500.

....

(v) A new Section R401.5, "Placement of backfill," is added to read:

R401.5 Placement of backfill. The provisions of Section 1804.3~~1804.2~~ of the Building Code of the City of Boulder shall apply to the placement of backfill.

....

(cc) Chapter 11, "Energy Efficiency," Sections N1101 through N1105 are repealed. A new Section N1101 is added to read:

N1101 Scope. Regulations concerning the design and construction of buildings for the effective use of energy and requirements for green building practices shall be administered in accordance with the *2030~~2017~~ City of Boulder Energy Conservation Code* as adopted by Chapter 10-7, "Energy Conservation Code," B.R.C. 1981.

....

(gg) Section M1601.4.10~~M1601.4.9~~, "Flood hazard areas," is repealed and reenacted to read:

M1601.4.10~~M1601.4.9~~ Flood hazard areas. In floodplains, as established in Title 9, Land Use Code, B.R.C. 1981, duct systems shall be located or installed in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(hh) A new sentence is added to Section M1602.2~~M1602.1~~, "Return air," to read:

Within individual dwelling units there shall be at least one return air opening on each floor.

....

~~(kk) Chapter 23 is renamed to read "Solar Energy Systems and Solar Ready Buildings."~~

~~(ll) A new Section M2303, "Solar photovoltaic power systems," is added to read:~~

~~**M2303 Solar photovoltaic power systems.** Solar photovoltaic power systems shall also meet the provisions of Section E3804, as amended.~~

~~(mm) A new Section M2304, "Requirements for Solar Ready Buildings," is added to read:~~

~~**M2304.1 General.** All new buildings shall comply with the requirements of this Section M2304.1. This section shall not apply to additions, alterations or repairs to existing buildings.~~

~~**M2304.1.1 Solar Zone.** Solar Zones shall be clearly indicated on the construction documents.~~

~~**M2304.1.1.1 Location and Size of Solar Zones.** The solar zone shall have a minimum total area as described below. The solar zone shall comply with access, pathway, smoke ventilation, and spacing requirements as specified in the Boulder Revised Code. The solar zone total area shall be comprised of one or more rectangular areas that are no less than 80 square feet and no side of any rectangular area shall be less than five feet in length. The solar zone shall be located:~~

~~1. On the roof or overhang of the building,~~

~~2. On the roof or overhang of another structure located within 250 feet of the building on the same parcel or lot,~~

~~3. On covered parking installed with the building project, or~~

~~4. On a façade that is less than 15 degrees greater or less than true south.~~

~~The solar zone shall have a total area of no less than 40 percent of the total roof area, as measured by the area of the roof planes. The following roof areas can be excluded when calculating the total roof area of the building:~~

~~1. Roof areas with a permanently installed domestic solar water heating system.~~

~~2. Roof areas where the annual solar access is less than 70 percent. For the purpose of this code, solar access means the ratio of solar insolation including shade to the solar insolation without shade. Shading from obstructions located on the roof or any other part of the building shall not be included in the determination of annual solar access.~~

~~**Exception**: Solar zones are not required in:~~

~~1. Buildings with a permanently installed solar electric system having a nameplate DC power rating, measured under standard test condition of no less than one watt per square foot of roof area.~~

~~2. Buildings where the roof is designed and approved to be used for vehicular traffic or parking or for a heliport.~~

~~**M2304.1.1.2 Orientation.** All sections of the solar zone located on steep slope roofs shall be oriented between 90 degrees and 270 degrees of true north.~~

~~**M2304.1.1.3 Shading.**~~

~~1. No obstructions, including but not limited to, vents, chimneys, architectural features, and roof mounted equipment, shall be located in the solar zone.~~

~~2. Any obstruction located on the roof or any other part of the building that projects above a solar zone shall be located at least twice the distance, measured in the horizontal plane, of the height difference between the highest point of the obstruction and the horizontal projection of the nearest point of the solar zone, measured in the vertical plane.~~

~~**Exception:** Any roof obstruction, located on the roof or any other part of the building, that is oriented north of all points on the solar zone.~~

~~**M2304.1.1.4 Structural Design Loads on Construction Documents.** For areas of the roof designated as solar zone, the structural design loads for roof dead load and roof live load shall be clearly indicated on the construction documents.~~

~~**NOTE:** The inclusion of any collateral loads for future solar energy systems is not required.~~

~~**M2304.1.2 Interconnection Pathways.** The construction documents shall indicate a location for inverters and metering equipment and a pathway for routing of conduit for the solar zone to the point of interconnection with the electrical service.~~

~~**M2304.1.3. Documentation.** A copy of the construction documents or a comparable document indicating the information from Sections M2304.1.1 through M2304.1.2 shall be provided to and maintained by the building owner. The building owner shall provide a copy of the construction documents or a comparable document indicating the information from Sections M2304.1.1 through M2304.1.2 to any purchasers and subsequent owners of the building or any part thereof.~~

~~**M2304.1.4. Main Electrical Service Panel.**~~

~~1. The main electrical service panel shall have a minimum busbar rating of no less than 200 amps.~~

~~2. The main electrical service panel shall have a reserved space to allow for the installation of double pole circuit breakers for a future solar electric installation.~~

~~A. Location. The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location.~~

~~B. Marking. The reserved spaces shall be permanently marked as "For Future Solar Electric."~~

....

(vv) Section P3009, "Subsurface Landscape Irrigation Systems~~Gray water recycling systems~~," is deleted in its entirety.

(ww) Section P3101.5, "Flood resistance," is repealed and reenacted to read:

P3101.5 Flood resistance. In floodplains, as established in Title 9, Land Use Code, B.R.C. 1981, vents shall be located or installed in accordance with the provisions of Title 9, Land

Use Code, B.R.C. 1981.

(xx) A new Section E3804, "Solar photovoltaic power systems," is added to read:

E3804 Solar photovoltaic power systems. Solar photovoltaic power systems shall meet the provisions of sections 605.11 through 605.11.3.2.3 of the City of Boulder Fire Code.

(yy) New Subsections E3901.13, "Electric vehicle charging requirements for new construction," and E3901.14, "Electric vehicle charging requirements for renovations," are added to read:

E3901.13 Electric vehicle charging requirements for new construction. Every new dwelling unit in a detached one- and two-family dwelling or townhouse shall include the following in at least one of the provided off-street parking spaces:

1. A 240-volt dedicated electric vehicle charging receptacle outlet, and
2. A 120-volt dedicated electric vehicle charging receptacle outlet.

The electric vehicle charging receptacle outlets shall be labeled as an electric vehicle outlet.

E3901.14 Electric vehicle charging requirements for renovations. For every dwelling unit where a garage is converted to habitable space, at least one 120-volt or 240-volt dedicated electric vehicle charging receptacle outlet shall be provided adjacent to at least one of any provided parking spaces.

Exception: A dedicated charging outlet is not required if off-street parking is not provided.

The electric vehicle charging receptacle outlets shall be labeled as an electric vehicle outlet.

(zz) Section E4209.3, "Accessibility," is amended by adding the following to the end of the section:

Equipment shall be accessed by a panel with a minimum size of 12 inches (305 mm).

(aaa) Appendix F, "Radon Control Method," is hereby repealed and reenacted to read as follows:

APPENDIX F
RADON CONTROL METHOD

The requirements of Appendix F to the 20182015 edition of the *International Residential Code* of the International Code Council shall hereby be complied with which appendix is hereby adopted by reference as part of the City of Boulder Residential Code and have the same force and effect as though fully set forth in this subsection, except as specifically amended by the provisions of this subsection.

(bbb) Section AJ102.5, "Flood hazard areas," is repealed and reenacted to read:

AJ102.5 Flood hazard areas. Work performed in existing buildings located in a floodplain, as established by Title 9, Land Use Code, B.R.C. 1981, shall be done in accordance with the applicable provisions of Title 9, Land Use Code, B.R.C. 1981.

(**) Appendix P, "Sizing of Water Piping System," is hereby repealed and reenacted to read as follows:

APPENDIX P
SIZING OF WATER PIPING SYSTEM

The requirements of Appendix P to the 2018 edition of the *International Residential Code* of the International Code Council shall hereby be complied with which appendix is hereby

adopted by reference as part of the City of Boulder Residential Code and have the same force and effect as though fully set forth in this subsection, except as specifically amended by the provisions of this subsection.

(**) Appendix Q, "Tiny Houses," is hereby repealed and reenacted to read as follows:

APPENDIX Q
TINY HOUSES

The requirements of Appendix Q to the 2018 edition of the *International Residential Code* of the International Code Council shall hereby be complied with which appendix is hereby adopted by reference as part of the City of Boulder Residential Code and have the same force and effect as though fully set forth in this subsection, except as specifically amended by the provisions of this subsection.

AQ101.1 "Scope" is hereby repealed and reenacted to read as follows:

This appendix shall be applicable to tiny houses used as single dwelling units. Tiny houses shall comply with this code except as otherwise stated in this appendix. Tiny houses shall be on permanent foundations and permanently connected to utilities, as required by this code. Tiny houses constructed off-site shall be inspected and approved for compliance with this code, by third party special inspectors pre-approved by the building official. The building official may use the provisions of the City of Boulder Building Code to administer the requirements for approving special inspectors.

(eee***) A new footnote notation "b" is added to the heading and a new footnote "b" is added to AP Table AP103.3(2), "Load values assigned to fixtures," reading:

b. For the purpose of determining the largest instantaneous demand required in order to size a water meter, ~~or for determining the amount of the plant investment fee,~~ this table is repealed and replaced by Chapter 11-1-35, "Meter Size Requirements," ~~the Fixture Unit/GPM Demand Chart and PIF Computation sheet found at Appendix A to Chapter 11-1, "Water Utility,"~~ B.R.C. 1981.

Section 6. Tile 10 is amended to add a new Chapter 10-5.6, "Existing Building Code," B.R.C. 1981 to read as follows:

10-5.6-1 Legislative Intent.

The purpose of this chapter is to protect the public health and safety by regulating the repair, alteration, change of occupancy, addition to and relocation of existing buildings in the city. This chapter is intended to encourage the use and reuse of existing buildings while requiring reasonable upgrades and improvements. The city council hereby adopts the 2018 edition of the International Existing Building Code with certain amendments, additions and deletions found to be in the best interests of the city.

10-5.5-2 – Adoption of the International Existing Building Code With Modifications.

(a) The 2018 edition of the *International Existing Building Code* of the International Code Council is hereby adopted by reference as the City of Boulder Existing Building Code and has

the same force and effect as though fully set forth in this chapter, except as specifically amended by the provisions of this chapter. This code shall be administered in accordance with Chapter 1, "Administration," of the International Building Code as adopted, with amendments, by Section 10-5-2, "Adoption of International Building Code With Modifications," B.R.C. 1981.

(b) Section 104.2.1, Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas, is amended by the addition of a new sentence to read: "In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981."

(c) Section 104.10.1, "Flood hazard areas," is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(d) Section 109.3.3, "Lowest floor elevation," is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(e) Section 301.3 Alteration, addition or change of occupancy, is amended by replacing the exception with the following:

Exception:

Subject to the approval of the code official, alterations complying with the laws in existence at the time the building or the affected portion of the building was built shall be considered in compliance with the provisions of this code. New structural members added as part of the alteration shall comply with the International Building Code. This exception shall not apply to alterations that constitute substantial improvement in flood hazard areas, which shall comply with Section 503.2, 701.3 or 1301.3.3; and in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981. This exception shall not apply to the structural provisions of Chapter 5 or to the structural provisions of Sections 706, 806 and 906.

(f) Section 401.3 "Flood hazard areas" is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(g) Section 405.2.5 "Flood hazard areas" is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(h) Section 502.3 "Flood hazard areas" is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(i) Section 503.2 Flood hazard areas is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(j) Section 507.3 "Flood hazard areas" is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(k) Section 701.3 "Flood hazard areas" is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(l) Section 1103.3 "Flood hazard areas" is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(m) Section 1201.4 "Flood hazard areas" is repealed and reenacted to read:

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(n) Section 1301.3.3 "Compliance with flood hazard provisions" is repealed and reenacted to read:

1301.3.3 Compliance with flood hazard provisions.

In floodplains, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(o) Section 1402.6 "Flood hazard areas" is repealed and reenacted to read:

If relocated or moved into a flood hazard area, as established in Title 9, Land Use Code, all work on structures in the scope of this code shall also be in accordance with the provisions of Title 9, Land Use Code, B.R.C. 1981.

(p) Section 803.2.2 "Groups A, B, E, F-1, H, I, M, R-1, R-2, R-4, S-1 and S-2" is repealed and reenacted to read:

———In buildings with occupancies in Groups A, B, E, F-1, H, I, M, R-1, R-2, R-4, S-1 and S-2, *work areas* that have exits or corridors shared by more than one tenant or that have exists or corridors serving an occupant load greater than 30 shall be provided with automatic sprinkler protection where both of the following conditions occur:

1. The *work area* is required to be provided with automatic sprinkler protection in accordance with the *International Building Code* as applicable to new construction.

2. The *work area* exceeds 50 percent of the floor area.

(q) Section 904.1.4 Other required automatic sprinkler systems, is repealed and reenacted to read:

904.1.4 Other required automatic sprinkler systems.

In buildings and areas listed in Table 903.2.11.6 of the *International Building Code*, *work areas* that have exits or corridors shared by more than one tenant or that have exits or corridors serving an occupant load greater than 30 shall be provided with an automatic sprinkler system under the following conditions:

1. The work area is required to be provided with an automatic sprinkler system in accordance with the International Building Code applicable to new construction.

(r) APPENDIX B, "SUPPLEMENTARY ACCESSIBILITY REQUIREMENTS FOR EXISTING BUILDINGS AND FACILITIES," and sections contained therein are adopted.

Section 7. Chapter 10-6, "Electrical Code," B.R.C. 1981, is amended as follows:

....

10-6-2. - Adoption of the National Electrical Code With Modifications.

(a) The current National Electrical Code of the National Fire Protection Association, as currently adopted by the State of Colorado or as is from time to time modified, reenacted or readopted by the State of Colorado is hereby adopted by reference as the City of Boulder Electrical Code or electrical code and has the same force and effect as though fully set forth in this chapter, except as specifically amended by the provisions of this chapter.

(b) This code shall be administered in accordance with Chapter 1, Administration, of the 20182012 edition of the International Building Code and Appendix K, Administrative Provisions, of the 20182012 edition of the International Building Code, as adopted, respectively, with amendments, by Section 10-5-2, "Adoption of the International Building Code With Modifications," B.R.C. 1981.

~~**10-6-3. - Electric Vehicle Charging Requirements for New Multifamily Dwellings.**~~

~~Every newly-permitted multifamily dwelling with more than twenty-five parking spaces shall include the following:~~

~~(a) Ten percent of parking spaces shall have one 240-volt and one 120-volt dedicated charging receptacle outlet.~~

~~(1) Accessible Spaces. Ten percent of accessible parking spaces, but in no case less than one accessible parking space, shall have one 240-volt and one 120-volt dedicated charging receptacle outlet. Parking in accessible spaces where electric vehicle supply equipment is installed shall not be limited to electric vehicles when no other comparable accessible space is available.~~

~~(2) Designation. Fifty percent of the parking spaces with a required dedicated charging receptacle outlet for electric vehicles shall be designated for electric vehicle charging.~~

~~(b) At least two parking spaces shall have a Level 2 dual port electric vehicle charging station. These two parking spaces with a Level 2 dual port electric vehicle charging station shall be designated for electric vehicle charging.~~

~~**10-6-4. - Electric Vehicle Charging Requirements for New Commercial Structures and R-1 and R-2 Occupancies.**~~

~~Every newly permitted commercial structure with more than twenty-five parking spaces and buildings serving a Group R-1 or R-2 occupancy shall comply with the following:~~

~~(a) Ten percent of parking spaces shall have one 240-volt and one 120-volt dedicated charging receptacle outlet.~~

~~(1) Accessible spaces. Ten percent of accessible parking spaces, but no less than one accessible parking space, shall have one 240-volt and one 120-volt dedicated charging receptacle outlet. Parking in accessible spaces where electric vehicle supply equipment is installed shall not be limited to electric vehicles when no other comparable accessible space is available.~~

~~(2) Designation. Fifty percent of the parking spaces with a required dedicated charging receptacle outlet for electric vehicles shall be designated for electric vehicle charging.~~

~~(b) In commercial structures with more than twenty-five parking spaces, at least two parking spaces shall have a Level 2 dual port electric vehicle charging station. These two parking spaces with a Level 2 dual port electric vehicle charging station shall be designated for electric vehicle charging.~~

~~(c) Buildings serving a Group R-1 or R-2 occupancy shall have a Level 2 dual port charging station in one percent of, but no less than two, parking spaces. Parking spaces with a required Level 2 dual port electric vehicle charging station shall be designated for electric vehicle charging.~~

10-6-35. - Arc-Fault Circuit-Interrupter Protection in Existing Dwelling Units.

When electrical panels or sub-panels are replaced or added in existing dwelling units, arc-fault circuit interrupter protection shall be provided for each replaced or added electrical panel or subpanel meeting the standards for new construction under the City of Boulder Electrical Code. The listed arc-fault circuit interrupter protective device shall be located at the origin of each circuit requiring protection.

Section 8. Chapter 10-7, "Energy Conservation Code," B.R.C. 1981 is amended as follows:

....

10-7-2. - Energy Conservation Code.

(a) Council adopts by reference the ~~*2017 2020 City of Boulder Energy Conservation Code*~~ of the International Code Council which shall have the same force and effect as though fully set forth in the Boulder Revised Code, 1981. This chapter and the ~~2017~~ *2020 City of Boulder Energy Conservation Code* shall be administered, applied, and interpreted in accordance with and as part of Chapter 10-5, "Building Code," B.R.C. 1981.

....

Section 9. Chapter 10-7.7, "Commercial and Industrial Energy Efficiency," B.R.C. 1981, is amended as follows:

....

10-7.7-4. - Required Lighting Upgrades.

(a) Within five years of the first reporting requirement, each owner shall:

(1) Replace or upgrade any interior lighting fixtures as necessary to meet lighting power allowances for interior lighting established in the ~~2017~~ *2020 City of Boulder Energy Conservation Code*.

(2) Replace or upgrade any exterior lighting fixtures as necessary to meet lighting power allowances for exterior lighting established in the ~~2012~~ *2020 International Energy Conservation Code*.

(3) Comply with requirements for automatic time switch control devices, occupancy sensors, and exterior lighting controls as necessary to meet the ~~2017~~ *2020 City of Boulder Energy Conservation Code*.

....

10-7.7-8. - Large Industrial Campus.

....

(b) The owner of a large industrial campus shall:

(1) On or before June 1, 2019 and at least once every ten years thereafter, conduct an energy assessment that covers at least seventy-five percent of the total energy usage on the large industrial campus; and

(2) Within two years after each assessment, the owner must implement any measures recommended that are projected to produce monetary savings over a one-year period equal to or in excess of the cost of implementation, less the value of rebates.

(c) By June 1, 2025, each owner of a large industrial campus shall:

(1) Replace or upgrade any interior lighting fixtures necessary to meet the lighting power allowances for interior lighting established in the ~~2017~~ *2020 City of Boulder Energy Conservation Code*.

(2) Replace or upgrade any exterior lighting fixtures as necessary to meet the lighting power allowances for exterior lighting established in the ~~2012~~ *2020 International Energy Conservation Code*.

(3) Comply with the requirements for automatic time switch control devices, occupancy sensors, and exterior lighting controls as necessary to meet the ~~2017~~ *2020 City of Boulder Energy Conservation Code*.

....

Section 10. Chapter 10-8, "Fire Code," B.R.C. 1981, is amended as follows:

10-8-1. - Legislative Intent.

The purpose of this chapter is to protect public health and safety by regulating the use, condition, construction, alteration, and repair of property, structures, and occupancies in the city in order to prevent the ignition and spread of fire and risk of harm to persons or property from fire and other causes. The city council hereby adopts the 2018 ~~2012~~ edition of the *International Fire Code* with certain amendments, additions, and deletions thereto found to be in the best interests of the city. The standards provided in this chapter shall be used, insofar as they are applicable, in determining whether a condition is hazardous, whether any work that has been performed has been done in an approved manner, or whether any equipment is of an approved type or quality, and in any determination concerning fire hazards and fire safety in the city building code not specifically provided for therein.

10-8-2. - Adoption of International Fire Code With Modifications.

(a) The 2018 ~~2012~~ edition of the *International Fire Code* of the International Code Council is adopted by reference as the City of Boulder Fire Code, and has the same force and effect as though fully set forth in this chapter, except as specifically amended by the provisions of this chapter.

(b) The Fire Code adopted by Subsection (a) of this section is amended in the following places:

(1) Section 102.3 is repealed and reenacted to read:

102.3 Change of use or occupancy. No change shall be made in the use or occupancy of any structure that would place the structure in a different division of the same group or occupancy or in a different group of occupancies, unless such structure is made com comply with the requirements of this code and the International Building Code.

(2) Section 103.1 is repealed and reenacted to read:

103.1 Community Risk Reduction~~Division of Fire Safety~~.

A Community Risk Reduction ~~Division of Fire Safety~~ is established within the fire department under the direction of the manager, which shall consist of such fire department personnel as may be assigned thereto by the manager. The function of this division shall be to assist the manager in the administration and enforcement of the provisions of this code.

....

(5) Section 105.6 is repealed and reenacted to read:

105.6 Required operational permits. The fire code official may issue an operational permit for the following operations:

(a) 105.6.14, Explosives

(b) 105.6.32~~105.6.30~~, Open Burning

(c) 105.6.36, Outdoor assembly events~~105.6.32, Open Flames and Candles~~

(d) 105.6.38, Plant extraction systems

(ed) 105.6.40~~105.6.36~~, Pyrotechnic special effects material

~~(6) Section 105.6.43 is amended by the addition of the following:~~

(f) 105.6.47~~105.6.43~~, Temporary membrane structures and; tents ~~and canopies. An operational permit may be issued with the construction permit that will be issued by the building official.~~

(67) Section 105.7 is repealed and reenacted to read:

105.7 Required construction permits. All construction permits will be issued by the building official. Community Risk Reduction ~~The Division of Fire Safety~~ will be the approving authority for the following:

(a) 105.7.1, Automaue fire-extinguishing systems.

(b) 105.7.7~~105.7.6~~, Fire alarm and detection systems and related equipment.

(c) 105.7.8~~105.7.7~~, Fire pumps and related equipment.

(d) 105.7.11 Gas detection systems

(e) 105.7.14 High-pile combustible storage

(f) 105.7.18 Plant indoor cultivation and extraction systems

(gd) 105.7.24~~105.7.15~~, Stand-pipe systems.

(78) Section 109~~108~~, "Board of Appeals," is repealed and reenacted to read:

109~~108~~ Appeals.

(a) Any appeal under this section shall be heard by the Board of Building Appeals established under Section 2-3-4, "Board of Building Appeals," B.R.C. 1981, unless the city manager determines, due to the nature of the issues in a particular appeal, to appoint a hearing officer under Section 1-3-5, "Hearings and Determinations," B.R.C. 1981.

....

(9) Section 110.1~~109.1~~, "Unlawful acts," is repealed and reenacted to read:

~~109.1~~110.1 Violations.

....

(10) Section 110.3 3~~109.3.3~~, "Prosecution of violations," is repealed.

(11) Section 110.4~~109.4~~, "Violation penalties," is repealed and reenacted to read:

110.4~~109.4~~ Abatement of violation. In addition to the imposition of the penalties described in Section ~~109.1~~110.1, "Violations," the fire code official is authorized to institute appropriate action to prevent unlawful construction or to restrain, correct, or abate a violation; or to prevent illegal occupancy of a structure or premises; or to stop an illegal act, conduct of business, or occupancy of a structure on or about any premises.

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(12) Chapter 2, "Definitions," is amended by the addition of the following additional definitions. For any definition that already exists, it is repealed and reenacted with the definition listed here:

....

Open Burning is the burning of ~~any~~ materials where visible products of combustion are emitted directly into ~~or substance, including rubbish, wastepaper, wood, vegetative material or other flammable material in~~ the ambient air without passing through a chimney from a fireplace built in compliance with the City of Boulder Building Code~~where emissions are released directly in the air without passing through a chimney or stack~~.

....

Sky Lantern means an unmanned device, whether tethered or untethered, made of paper or other thin material with a frame that contains a candle or other fuel source which creates an open flame or other heat source designed to heat the air inside the device, causing it to lift into the air in a manner similar to a hot-air balloon.

~~*Tank Truck* means any single rear axle, self-propelled motor vehicle, equipped with a cargo tank mounted thereon, and used for the transportation of flammable and combustible liquids, but this term excludes any combination of units, such as a semi-trailer. Said tank truck shall not exceed 35,000 GVW, and its total capacity shall not exceed 3,000 gallons.~~

~~*Transport route* means:~~

~~(1) Denver-Boulder Turnpike (U.S. 36) from the south city limits to Baseline Road.~~

~~(2) Foothills Parkway (Colorado 157) from U.S. 36 to the north city limits.~~

~~(3) 28th Street from Baseline Road to the north city limits.~~

~~(4) Arapahoe Avenue from Folsom Street to the east city limits.~~

~~(5) Canyon Boulevard from 28th Street to the west city limits.~~

~~(6) Pearl Street/Pearl Parkway from Folsom Street to the east city limits.~~

~~(7) Longmont Diagonal Highway (Colorado 119) as it passes through the city limits.~~

~~(8) Valmont Road from Folsom Street to 55th Street.~~

~~(9) Airport Road and Airport Boulevard.~~

~~(10) Baseline Road from 27th Way to Foothills Parkway (Colorado 157).~~

~~(11) 55th Street from Valmont Road to Arapahoe Avenue.~~

~~(12) 30th Street from Arapahoe to Diagonal Highway (Colorado 119).~~

~~(13) Longmont Diagonal Highway (Colorado 119) from 28th Street to and connecting with Foothills Parkway (Colorado 157).~~

~~(14) South Foothills Parkway/Broadway (Colorado 93) from the south city limits to 27th Way and connecting to Baseline Road.~~

....

(13) Section 307, "Open burning, recreational fires, and portable outdoor fireplaces," is repealed and reenacted to read:

307 Open burning and recreational fires.

(1) No person shall kindle or maintain outside of a habitable building or outside of an exterior fireplace built in accordance with the City of Boulder Building Code any bonfire or burn or permit to be burned any trash, paper, rubbish, wastepaper, wood, weeds, brush, plants, or other combustible or flammable material anywhere within the city limits or anywhere on city property outside ....

(2) Mobile or portable type outdoor fire-places are prohibited to use within the city limits or anywhere on city property outside of the city limits.

(**) Section 308.1.6.3 is repealed and reenacted to read:

308.1.6.3 Sky lanterns. No person shall use any sky lantern within the City of Boulder, or anywhere on city-owned property outside of city limits, including Open Space and Mountain Parks land.

(**) Exceptions 1, 2 and 32 to Section 311.2.2, "Fire protection," are repealed.

(15) A new Section 401.9, "Fire alarm fees," is added to read:

401.9 Fire alarm fees.

(a) After the fire department has responded to two nuisance alarms from the ~~of~~ fire alarm system from any property or address in any calendar year, the city manager may impose a charge for each additional response to an alarm which originates from the property during the same calendar year, in accordance with the schedule prescribed by Section 4-20-52, "Fire Code Permit and Inspection Fees," B.R.C. 1981.

(b) The city manager may waive a charge imposed for a nuisance fire alarm response if the property owner of record demonstrates that such alarm was caused by a fire or the threat of a fire, or that such alarm was not under the property owner's control. It shall not be a defense that the alarm system is malfunctioning, unless the owner or manager is able to demonstrate that said alarm system is currently being serviced to remedy the problems being encountered.

(c) If any fee is not paid within thirty days after demand therefor has been mailed to the record owner of the building, the city manager may certify the amount due to the County Treasurer pursuant to Section 2-2-12, "City Manager May Certify Taxes, Charges, and Assessments to County Treasurer for Collection," B.R.C. 1981.

....

(18) Section 510.4.1.1 is repealed and reenacted to read:

510.4.1.1 Minimum signal strength into the building. A minimum signal strength of -95 dBm shall be receivable within the building.

(**) Section 514.4.1.2 is repealed and reenacted to read:

510.4.1.2 Minimum signal strength out of the building. A minimum signal strength of -95 dBm shall be received by the agency's radio system with transmitted from within the building.

(**) Section 603.4, "Portable unvented heaters," is repealed and reenacted to read:

603.4 Portable unvented heaters. Portable unvented fuel-fired heating equipment ~~is~~ are prohibited inside any occupied structure.

~~(19) Subsection 605.11.3.2.1, "Residential buildings with hip roof layouts," is repealed and reenacted to read:~~

~~**605.11.3.2.1 Residential buildings with hip roof layouts.** Panels/modules installed on residential buildings with hip roof layouts shall be located in a manner that provides a 3-foot-wide (914 mm) clear access pathway from the eave to the ridge on each roof slope where panels/modules are located.~~

~~**Exceptions:**~~

~~1. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (2:12) or less.~~

~~2. These requirements shall not apply to roofs where each panel/module array area on the roof is 1,000 square feet (92.90 m^2) or less in size, no continuous section of panels/modules is larger than 150 feet in length or width, a clear access pathway of not less than 12-inch width is provided along each side of all horizontal ridges, and a clear access pathway of not less than 30-inch width is provided from the eave to the ridge of one roof slope where panels/modules are located.~~

~~3. These requirements shall not apply to roofs where each panel/module array area on the roof is 1,000 square feet (92.90 m^2) or less in size, no continuous section of panels/modules is larger than 150 feet in length or width, a clear access pathway of not less than 12-inch width is provided along each side of all horizontal ridges, and, where panels/modules are to be placed on both sides of a hip, a clear access pathway of not less than 18-inch width is provided along each side of such hip.~~

~~4. These requirements shall not apply to roofs where the total combined area of solar array does not exceed 33 percent as measured in plan view of the total roof area of the structure.~~

~~(20) Subsection 605.11.3.2.2, "Residential buildings with a single ridge," is repealed and reenacted to read:~~

~~**605.11.3.2.2 Residential buildings with a single ridge.** Panels/modules installed on residential buildings with a single ridge shall be located in a manner that provides two 3-foot-wide (914 mm) clear access pathways from the eave to the ridge on each roof slope where panels/modules are located.~~

~~**Exceptions:**~~

~~1. This requirement shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (2:12) or less.~~

~~2. This requirement shall not apply to roofs where each panel/module array area on the roof is 1,000 square feet (92.90 m^2) or less in size, no continuous section of panels/modules is larger than 150 feet in length or width, and a clear~~

access pathway of not less than 12-inch width is provided along each side of the horizontal ridge, provided that:

a. The total combined area of solar array does not exceed 33 percent as measured in plan view of the total roof area of the structure; or

b. A 30-inch-wide clear access path is provided from the eave to the ridge of a roof slope where panels/modules are located.

(21) Subsection 605.11.3.2.3, "Residential buildings with roof hips and valleys," is repealed and reenacted to read:

605.11.3.2.3 Residential buildings with roof hips and valleys. Panels/modules installed on residential buildings with roof hips and valleys shall be located no closer than 18 inches (457 mm) to a hip or a valley where panels/modules are to be placed on both sides of a hip or valley. Where panels are to be located on only one side of a hip or valley that is of equal length, the panels shall be permitted to be placed directly adjacent to the hip or valley. In addition, a 12-inch-wide clear access pathway shall be provided along each side of any horizontal ridge.

Exceptions:

1. This requirement shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (2:12) or less.
2. These requirements shall not apply to roofs where a 30-inch-wide clear access pathway is provided from the eave to the ridge as well as 12-inch-wide clear access pathways along each side of any horizontal ridge.

(22) Subsection 605.11.3.2.4, "Residential building smoke ventilation," is repealed and reenacted to read:

605.11.3.2.4 Pathways. All access pathways required under this Section 605.11.3.2 shall be provided in a structurally strong location on the building capable of supporting the live load of firefighters accessing the roof.

....

(26) The first sentence of Section 903.2 is repealed and reenacted to read:

Approved automatic sprinkler system in new buildings and structures shall be provided in the locations described in sections 903.2.1 through 903.2.16~~903.2.15~~.

....

(28) A new subsection is added to Section 903.2.1 to read:

903.2.1.6 Group B occupancies. An automatic sprinkler system shall be provided throughout all new Group B occupancies greater than 2,000 gross square feet (185.8 m ^{2}).

(29) Section 903.2.3, Group E, #1, is repealed and reenacted to read:

An automatic sprinkler system shall be provided for Group E occupancies as follows:

(a) Throughout all Group E fire areas greater than 2,000 square feet (185.8 m ^{2}) in area.

(b) The Group E fire area is located on a floor other than a level of exit discharge serving such occupancies.

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(c) The Group E fire area has an occupant load of 300 or more.

~~(b) Exception is repealed.~~

(de) All basements classified as, or a part of, a Group E occupancy shall be provided with an automatic sprinkler system regardless of the gross square footage.

(30) Section 903.2.4, Group F-1, is repealed and reenacted to read:

An automatic sprinkler system shall be provided throughout all new Group F occupancies greater than 2,000 square feet (185.8 m^2).

~~(31) Exceptions 3 and 4 to Section 903.2.6, Group I, are repealed.~~

(32) Section 903.2.7, Group M, is repealed and reenacted to read:

An automatic sprinkler system shall be provided throughout all Group M occupancies greater than 2,000 square feet (185.8 m^2).

(33) Section 903.2.8 is amended by the addition of the following:

(a) Detached one- and two-family dwellings and multiple single-family dwellings (townhomes) not more than three stories above grade plane in height with a separate means of egress and their accessory structure shall comply with the fire sprinkler system requirements of the City of Boulder Residential Building Code.

(b) An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire areas.

~~Exception 1: Detached and two-unit attached dwelling units are not required to have an automatic fire sprinkler system if they are not used as residential board and care occupancies, and the distance, unobstructed by any structure above grade, landscaping, or topographical obstruction, from the curb face of the emergency vehicle access street on which the structure is addressed, to a face of the unit containing an entrance, is not greater than one hundred feet.~~

~~(b) Exception 2: A detached dwelling unit is not required to have an automatic fire sprinkler system if it is not used as a residential board and care occupancy, and is located on a lot larger than 14,500 square feet, in which the driveway meets the requirements of a fire department accessible private drive, and extends without interruption from the nearest emergency vehicle access street on which the structure is addressed, to the side of the building which contains the main entrance.~~

~~(c) If more than one principal building is constructed on a lot pursuant to the exceptions listed in Section 9-7-12, "Two Detached Dwelling Units on a Single Lot," B.R.C. 1981, then each building other than the building closest to an emergency vehicle access street on which the structure is addressed, shall be protected by an approved and supervised automatic sprinkler system in accordance with Section 903.3.~~

~~**Exception:** If a lot has frontage on two streets and each street is an emergency vehicle access street, then two buildings, each closest to their respective streets, shall not be required to be so protected by this subsection.~~

~~(d) Houses behind houses shall be protected throughout by an approved automatic sprinkler system in accordance with Section 903.3.~~

....

(**) A new Section 903.2.14, Group B Occupancies, is added to read:

Section 903.2.14 Group B Occupancies. An automatic sprinkler system shall be provided throughout all new Group B occupancies greater than 2,000 gross square feet (185.8m^2).

(37) A new Section 903.2.15~~903.2.14~~ is added to read:

903.2.15~~903.2.14.~~ Any occupancy, structure, or unit required to be protected by a sprinkler system by one provision of the fire code or the building code, and falling within an exception to a requirement of such protection to any other provision of the fire code or building code, shall be so protected.

(38) A new Section 903.2.16~~903.2.15~~ is added to read.

903.2.16~~903.2.15.~~ If the floor area of an addition to any existing occupancy as described in sections 903.1 through 903.2.14~~903.2.13~~ above is greater than either fifty percent of the existing gross floor area or 2,000 square feet, and the total altered structure would be required to be protected by a sprinkler system by this section if it were new construction, then the entire addition shall be protected throughout by an approved and supervised automatic sprinkler system, installed in accordance with Section 903.3.1. Said sprinkler system shall be continuous throughout the addition up to a fire barrier built in accordance with the building code for that occupancy.

(39) Section 903.3.1.1.1 Exception 4 is repealed.

(40) Section 903.3.1.2.3, #4 – Subsection 4.2 and 4.5 are repealed.

(**) Section 903.3.5.2~~903.3.5.1.2~~ is repealed and reenacted to read:

903.3.5.2~~903.3.5.1.2~~ Residential combination services. Combination of domestic and fire service lines shall be in accordance with the City of Boulder Design and Construction Standard.

....

(43) A new Section 903.7, "Response time sprinkler requirement," is adopted to read.

903.7 Response time sprinkler requirement.

(a) It is the city's goal, as reflected in the Boulder Valley Comprehensive Plan's urban fire service criteria, that land not be annexed unless the response travel time for service is normally four~~six~~ minutes or less. Nonetheless, there may be occasions when annexation outside the existing four~~six~~-minute travel time~~limit~~ but within six~~eight~~ minutes or less is allowed, due to special circumstances, in the city's best interest. Before such land is annexed, consideration must be given to the need for and provision of additional fire stations and equipment to serve properly the area being annexed and to bring it within the four~~six~~-minute travel time ~~limit~~ eventually. Protection by a sprinkler system as required by subsection (c) below is a temporary substitute, and is not intended to eliminate the requirement for additional fire stations and equipment.

(b) Land used or to be used for residential purposes will not normally be annexed if it is outside the four~~six~~-minute travel time~~limit~~ unless excepted from this

policy by subsection (d) below. All new dwelling units on land annexed outside the foursix-minute travel timelimit shall be protected by an automatic fire sprinkler system.

(c) On land annexed after the effective date of this chapter and not excepted under subsection (d) below, all new nonresidential construction and any existing nonresidential structures shall be provided throughout with an approved and supervised fire sprinkler system installed in accordance with Section 903.3.1 adopted in Chapter 10-8, "Fire Code," B.R.C. 1981, if such land is outside of the foursix minute travel City of Boulder fire response time from city fire stations housing at least one pumper which is rated at one thousand gallons per minute pumping capacity or greater, and which requires a crew of three or more for proper operation.

....

(45) Section 907.6.6907.6.5 is repealed and reenacted to read:

907.6.6907.6.5 Monitoring. Fire alarm systems shall be supervised by an Underwriters Laboratory listed supervising station or a Proprietary Supervising Station Alarm System meeting all of the requirements in NFPA 72, *The National Fire Alarm and Signaling Code*.

Exception: Monitoring by a supervising station is not required for:

(1) Single and multiple-station smoke alarms required by Section 907.2.10

(2) Automatic sprinklers systems in one and two family dwellings.

(46) Section 1103.5, "Sprinkler systems," is repealed and reenacted to read:

1103.5 Sprinkler systems. The automatic sprinkler system requirements set forth in sections 903.1 and 903.2 of this code shall be complied with in existing buildings where the occupancy or use, as defined in Chapter 23 of the Existing Building Code of the City of Boulder, changes in a fire area exceeding 2,000 square feet.

Exception: Changes of occupancy or use which are a lower relative hazard per Table 1011.4 of the City of Boulder Existing Building Code and the new occupancy or use is not required to be provided with an automatic sprinkler system by other provisions of the City of Boulder Building Code or the City of Boulder Existing Building Code.

(**) Section 1204.2.1.1, Pathways to ridge, is repealed and reenacted to read:

1204.2.1.1, Pathways to ridge. No fewer than two 30-inch-wide (914 mm) pathways on separate roof planes, from the lowest roof edge to ridge, shall be provided on all buildings. At least one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, at least one 30-inch-wide (914 mm) pathway from lowest roof edge to ridge shall be provided on the same roof plane as the photovoltaic array, on an adjacent roof plane or straddling the same and adjacent roof plane.

All access pathways required under this section shall be provided in a structurally strong location on the building capable of supporting the live load of fire fighters accessing the roof.

(**) Section 1204.2.1.2, Setbacks at ridge, is repealed and reenacted to read:

1204.2.1.2, Setbacks at ridge. Not less than a 12-inch-wide setback is provided on each side of the horizontal ridge.

(**) Section 1204.2.1.3, Alternative setbacks at ridge, is repealed.

(47) Section 5601.2.4.2, "Fireworks," is amended by the addition of the following:

The city manager shall require a certificate of insurance to protect persons and property from death or injury as a result of the fireworks display, in an amount not less than ~~$1,000,000~~150,000 general liability per occurrence ~~person injured~~ and ~~$2,000,000~~600,000 aggregate limit~~per incident~~. The insurance shall cover any liability of the city or any employee or agent thereof arising out of or connected with the permit and the fireworks display permitted thereunder. Before any permit for a fireworks display is issued, the applicant shall comply with the provisions of this section.

~~(48) Section 5701.4, "Permits," is amended by the addition of the following:~~

~~(1) A regular permit allows a permittee on a transport route to take delivery of flammable and combustible liquids from any delivery vehicle or from a tank truck where the premises are located on a transport route. Upon payment of the fee provided in Section 4-20-52, "Fire Code Permit and Inspection Fees," B.R.C. 1981, the city manager shall issue to an applicant therefor a permit to receive deliveries of flammable and combustible liquids at a particular location or outlet if the manager finds that:~~

~~(a) The outlet or location contains sufficient room to accommodate the delivery vehicle, so that the delivery vehicle is capable of being parked entirely within the property boundary lines of the outlet or location and in such a manner that no part of the vehicle extends into any street, sidewalk, or alley while the vehicle is off-loading and no backing of the vehicle either into or out of station property is necessary;~~

~~(b) The entrance and exit access ways for the delivery vehicle are so arranged that no obstruction of traffic will result from the vehicle entering or leaving the outlet or location; and~~

~~(c) The storage tanks for flammable and combustible liquids are located underground and constructed in accordance with the applicable provisions of this code, unless specifically allowed to be installed above ground by other sections of this code.~~

~~(2) A special permit allows a permittee to take delivery of flammable and combustible liquids on premises outside of transport routes from specified delivery vehicles other than a tank truck. The owner or person in control of any outlet or location holding a regular permit may, upon payment of the fee provided in Section 4-20-52, "Fire Code Permit and Inspection Fees," B.R.C. 1981, apply to the city manager for a special permit allowing delivery with a vehicle other than a tank truck as defined in Section 221. The manager shall schedule with the applicant a simulated demonstration with an empty vehicle of the size and design that the applicant will use under the permit. The applicant shall furnish~~

~~the vehicle and driver at its cost. The simulated test shall be observed by the manager who shall issue the special permit if the manager finds that:~~

~~(a) The outlet or location contains sufficient room to accommodate the delivery vehicle, so that the delivery vehicle is capable of being parked entirely within the property boundary lines of the outlet or location in such a manner that no part of the vehicle shall extend into any street, sidewalk, or alley while the vehicle is off-loading, and no backing of the vehicle either into or out of the station property is necessary;~~

~~(b) The entrance and exit access ways for the delivery vehicles are so arranged that no obstruction of traffic will result from the vehicle entering or leaving the outlet or location;~~

~~(c) The roads and streets are accessible to fire-fighting equipment and vehicles;~~

~~(d) The topography or configuration of the roads and streets does not involve potential difficulties in containing, fighting, or suppressing a fire or spill and does not impair the ability of a transport vehicle to maneuver safely; and~~

~~(e) The traffic congestion and flow of vehicles using the roads and streets will not create potential hazards to transport vehicles.~~

~~Upon issuance, the permit will designate a specific route to be followed from the nearest transport route to the permit location and to return to the transport route. The permit will specify a vehicle capacity. Special permits are valid only between 3 a.m. and 6 a.m. But, for the delivery of gasoline or diesel fuel only, if the permit location is in an industrial zone and is connected to a transport route by a former transport route established by ordinance 4636 (1982), and the applicant demonstrates that there were no incidents involving the discharge of gasoline or diesel fuel from delivery vehicles using the relevant portion of such former route, then the manager may issue the special permit for such other hours as the applicant is able to demonstrate present no more hazard than delivery during the hours of 3 a.m. through 6 a.m.~~

~~(3) Revocation or Suspension of Permits.~~

~~(a) Each of the following is a ground for revocation of a special permit:~~

~~1. Failure of a transport vehicle to park entirely on the site while unloading;~~

~~2. Obstructing of sidewalks while unloading;~~

~~3. Backing the vehicle onto or off of the site;~~

~~4. Obstruction of traffic while entering or leaving;~~

~~5. Failure of a transport driver to follow the prescribed route to or from the permit location;~~

~~6. Failure to maintain a copy of the special permit on the premises; or~~

~~7. Failure of a transport driver to be present while off-loading.~~

~~(b) Each of the following is a ground for suspension of a regular permit for up to fourteen days:~~

~~1. Failure of a transport vehicle to park entirely on the site while unloading;~~

~~2. Obstructing of sidewalks while unloading;~~

~~3. Backing the vehicle onto or off of the site;~~

~~4. Obstruction of traffic while entering or leaving;~~

~~5. Failure of a transport driver to follow the prescribed route to or from the permit location; or~~

~~6. Failure of a transport driver to be present while off-loading.~~

(c) When matters are brought to the attention of the city manager, which if substantiated would be grounds for revocation of a special permit or suspension of a regular permit, the manager shall issue a written notice thereof to the permittee containing a concise written statement of the violation constituting grounds for revocation or suspension and indicating that the revocation or suspension shall take effect fourteen days after the issuance of said notice unless the permittee appeals in accordance with the terms of Section 108.

(d) All special permit revocations shall be for a period of six months, after which time the permittee may reapply for a special permit. During the period of revocation, the outlet may continue to operate with and according to the terms of a regular permit.

(4) If, due to changed conditions, including, without limitation, changes in the transport routes, the manager has probable cause to believe that an existing regular or special permit no longer meets the criteria for issuance, the manager may require a new simulated demonstration. For purposes of notice and appeal, such proceedings shall be deemed a new application, but no additional fee shall be charged.

(49) A new Section 5701.6, "Prohibited acts," is adopted to read:

5701.6 Prohibited acts.

(a) No owner and no person in control of any outlet or location shall accept deliveries of flammable or combustible liquids, unless such person has applied for and has been issued a permit therefor by the city manager.

(b) No owner and no person in control of any outlet or location for which a permit to accept deliveries of flammable or combustible liquids has been issued shall accept deliveries of such liquids unless delivery is in compliance with all the provisions of this code and any conditions on the permit.

(c) No person shall spill more than thirty-two fluid ounces of flammable or combustible liquid upon the ground.

(d) No person shall fail to notify the fire department of any spill of flammable or combustible liquid of more than thirty-two fluid ounces at the earliest practicable moment after said spill has occurred.

(e) Except to replace existing tanks, no person shall install any tanks used for the storage of any type of flammable or combustible liquid, or other hazardous material or waste in the floodplain as defined in Chapter 9-16, "Definitions," B.R.C. 1981. This prohibition is not retroactive, but no person shall use or maintain any tank installed in violation of this prohibition.

(f) No person shall weld or cut by torch on the premises of a service station or allow or cause crankcase drainings to be spilled or poured onto the ground. No person shall dispose of hazardous materials by dumping or pouring on the ground or into a storm drain or sanitary sewer or any connection thereto.

(50) Section 5704.2, "Tank storage," is amended by the addition of the following:

(a) Except for fuel carried on tank trucks, above-ground storage of all Class I, II, and III flammable and combustible liquids in aggregate amounts of more than 500 gallons of such liquids on a single lot is allowed only in those areas of the city zoned "industrial." All installations shall comply in all respects with chapter 57. Any tank intended for the

bulk storage of any Class I, II, or III flammable or combustible liquid may be stored above ground only in those areas of the city zoned industrial.

(b) Liquefied natural gas (LNG) or liquefied petroleum gas (LP-Gas) may be stored aboveground in areas of the city zoned "industrial" and dispensed at such sites by a service station if the city manager finds that such installation meets all the requirements of applicable fire codes before any dispensing of such fuel and proper and necessary on-site fire control devices are provided.

(c) All underground tanks used for dispensing or bulk storage of any flammable or combustible liquid shall comply with the requirements of chapter 57, Flammable and Combustible Liquids, any other pertinent city codes, including, without limitation, those concerning fire and flood, the Colorado State Oil Division, and the manufacturer's specifications for installation. Plans for installation shall be approved by the Colorado State Oil Division and the city flood control office before the city may issue permits for construction, installation, and use of the tanks. No person shall install a used tank.

(d) No person shall install a tank or tanks for the dispensing or bulk storage of any flammable or combustible liquid, including temporary installations on construction sites, until such person has first submitted plans for the installation to the city manager and has received approval of such plans and of the installation.

(51) A new Section 5706.2.8.2, "Safety devices required for outlets or locations accepting deliveries of flammable or combustible liquids," is adopted to read:

5706.2.8.2 Safety devices required for outlets or locations accepting deliveries of flammable or combustible liquids. No owner and no person in control of any outlet or location shall accept deliveries of flammable and combustible liquids, and no person shall make deliveries of such liquids to any outlet or location, unless the following conditions are met during such delivery:

(a) The hose connection employed in making a delivery of flammable or combustible liquids contains the safety device known as a "glass elbow" to allow inspection of the contents of the delivery hose; and

(b) Any hose used in making deliveries of flammable or combustible liquids contains the apparatus commonly known as a tight-fill connection device to secure the off-loading device of the delivery vehicle to the intake structure of the storage tank.

(c) Exceptions to (a) and (b) above may be granted by the city manager for industrial installations if conditions warrant.

(52) A new Section 5706.2.8.3, "Full compartment dumps required," is adopted to read:

5706.2.8.3 Full compartment dumps required. Any person delivering flammable and combustible liquids in a vehicle that contains compartments larger than six hundred gallons shall empty each such compartment at a single stop if any delivery of liquids is made at any outlet or location from any such compartment.

(53) In Chapter 80, "Referenced Standards," is amended by the addition of the following the NFPA standard reference numbers for 13, 13D, 13R, and 72 are repealed and reenacted to read:

8001 NFPA Standards. In every case where this code references a standard published by the National Fire Protection Association (NFPA), the most current edition of the referenced standard is hereby adopted. The most current edition of the referenced NFPA standard shall become effective on January 1st following the publication and release of the standard.

~~13-13~~
~~13D-13~~
~~13R-13~~
~~72-13~~

10-8-3. - Violations.

Repealed.

Section 11. Chapter 10-8.5, "Wildland Code," B.R.C. 1981, is amended as follows:

10-8.5-1. - Legislative Intent.

The purpose of this chapter is to protect public health and safety by regulating the use, condition, construction, alteration, repair, and maintenance of buildings, structures, and premises within the wildland-urban interface areas in the city in order to prevent the spread of fire and risk of harm to persons and property from the intrusion of fire from wildland fire exposures and fire exposures from adjacent structures, as well as to prevent structure fires from spreading to wildland fuels. The city council hereby adopts the 2018~~2012~~ edition of the *International Wildland-Urban Interface Code* with certain amendments, additions, and deletions thereto found to be in the best interests of the city.

10-8.5-2. - Adoption of the International Wildland-Urban Interface Code With Modifications.

(a) The 2018~~2012~~ edition of the *International Wildland-Urban Interface Code* of the International Code Council is adopted by reference as the City of Boulder Wildland Code and has the same force and effect as though fully set forth in this chapter, except as specifically amended by the provisions of this chapter.

....

(d) Section 103.1, "Creation of an enforcement agency," is repealed and reenacted to read:

103.1 Division of Building Safety. "Division of Building Safety" means the administrative unit established by the city manager or the manager's delegates, and the personnel assigned to the unit by the manager. The Division of Building Safety administers the City of Boulder Wildland Code assisted by a Community Risk Reduction~~Division of Fire Safety~~, established within the fire department, under the direction of the manager.

....

(b) Section 108.1, "General," is repealed and reenacted to read:

108.1 General. The requirements of Section 107.1~~106.1~~, "General~~Submittal documents~~," of the City of Boulder Building Code apply.

(i) Section 110.4.6~~109.4.6~~, "Prosecution of violation," is repealed and reenacted to read

110.4.6~~109.4.6~~ Violations.

....

(j) Section 110.4.7~~109.4.7~~, "Violation penalties," is repealed.

....

(m) Section 403.2.1, "Dimensions," is repealed and reenacted to read:

403.2.1 Dimensions. Driveways shall be provided as defined in Section 503.2.1, "Dimensions," of the City of Boulder Fire Code, as locally amended in Paragraph ~~10-8-1(15)~~10-8-2(b)(16), B.R.C. 1981, for an "accessible private drive" and with a minimum unobstructed height of 15 feet (4572 mm).

....

(q) 503.2 Ignition-resistant building material. Add the following, as option 5:

5. Deck surface. Approved wood thermoplastic composite lumber with an ASTM E84 flame-spread index no greater than 200, or any approved Class A roof assembly.

(**) Section 505.2, "Roof covering," is repealed and reenacted to read:

505.2 Roof covering. Roofs shall be installed in accordance with the requirements of the City of Boulder Building Code and the City of Boulder Residential Building Code, as applicable.

....

Section 12. Chapter 10-9, "Mechanical Code," B.R.C. 1981, is amended as follows:

10-9-1. - Legislative Intent.

The purpose of this chapter is to protect the public health and safety by regulating the installation, alteration, and repair of heating, ventilating, cooling, and refrigeration devices in structures in the city. The city council hereby adopts the 2018~~2012~~ edition of the *International Mechanical Code* with certain amendments and deletions thereto found to be in the best interests of the residents of the city.

10-9-2. - Adoption of the International Mechanical Code With Modifications.

(a) The 2018~~2012~~ edition of the *International Mechanical Code* , including Appendix A thereto, of the International Code Council, is hereby adopted by reference as the Mechanical Code of the City of Boulder or mechanical code and has the same force and effect as though fully set forth in this chapter, except as specifically amended by the provisions of this chapter.

....

Section 13. Chapter 10-9.5, "Fuel Gas Code," B.R.C. 1981, is amended as follows:

10-9.5-1. - Legislative Intent.

The purpose of this chapter is to protect the public health and safety by regulating fuel gas systems and gas-fired appliances in the city. The city council hereby adopts the 20182~~012~~ edition of the *International Fuel Gas Code* as a new Chapter 10-9.5 with certain amendments thereto found to be in the best interest of the city.

10-9.5-2. - Adoption of the International Fuel Gas Code With Modifications.

(a) The 20182~~012~~ edition of the *International Fuel Gas Code* of the International Code Council is hereby adopted by reference as the City of Boulder Fuel Gas Code or fuel gas code and has the same force and effect as though fully set forth in this chapter, except as specifically amended by the provisions of this chapter.

....

~~(e) Section 404.9.1 is repealed.~~

....

Section 14. Chapter 10-10, "Plumbing Code," B.R.C. 1981, is amended as follows:

10-10-1. - Legislative Intent.

The purpose of this chapter is to protect the public health and safety by regulating the installation, alteration, and repair of plumbing devices in structures in the city. The city council hereby adopts the 20182~~012~~ edition of the *International Plumbing Code* with certain amendments and deletions thereto found to be in the best interests of the residents of the city.

10-10-2. - Adoption of the International Plumbing Code With Modifications.

(a) The 20182~~012~~ edition of the *International Plumbing Code* , published by the International Code Council, including Appendix E, "Sizing of Water Piping System," is hereby adopted by reference as the City of Boulder Plumbing Code or plumbing code, and has the same force and effect as though fully set forth in this chapter, except as specifically amended by the provisions of this chapter.

(b) Except for Sections 101, 102, and 107, Chapter 1 is repealed. This code shall be administered in accordance with Chapter 1, "Administration," of the International Building Code as adopted, with amendments, by Section 10-5-2, "Adoption of International Building Code With Modifications," B.R.C. 1981.

(c) Section 101.1, "Title," is repealed and reenacted to read:

101.1 Title. These regulations shall be known as the Plumbing Code for the City of Boulder or plumbing code and will be referenced herein as "this code."

(d) The Exception to Section 301.3, "Connections to drainage system," is deleted in its entirety.

(e) Section 312.5, "Water supply system test," is amended by deleting the words "for piping systems other than plastic" and by modifying the test pressure required from 50 psi (344 kPa) to 100 psi (688 kPa).

(f) Section 403.2 Separate Facilities is amended to add the following Exception 5.

5. Separate facilities are not required when multiple fixture all gender facilities are provided. Multiple fixture all gender facilities are not required; they are an alternative to be determined by the property owner or the owners' agent.

(g) Section 403.4 "Signage" is repealed and reenacted to read:

403.4 Signage. Required public facilities shall be provided with signs that designate which genders the facility accommodates as required by section 2902.2. Signs shall be readily visible and located near the entrance to each toilet facility. Signs for accessible toilet facilities shall comply with Section 1111.

Exception: Toilet facilities with only one water closet shall not be identified for exclusive use by any gender and shall be deemed to meet the requirements of this section. Signage shall be provided in accordance with the requirements of the City of Boulder Building Code.

(h) Section 403.4.1 Directional signage. Directional signage indicating the route to the required public toilet facilities shall be posted in a lobby, corridor, aisle or similar space, such that the sign can be readily seen from the main entrance to the building or tenant space.

(i) Section 403.4.2 All gender signage. Single-user toilet facilities provided in accordance with Section 403.1.2, and family or assisted-use toilet facilities provided in accordance with Section 403.2.1, shall be provided with signs which clearly indicate the facilities are available for use by all genders.

(j) Section 403.4.2.1 Existing single-user toilet facilities. After December 31, 2020, all existing single-user toilet facilities and family or assisted-use toilet facilities, shall be provided with signage in accordance with Section 403.4.2.

~~Section 504.7.1 "Piping for safety pan drains shall be of those materials listed in Table 605.4." is repealed.~~

(kg) TABLE 404.4 Maximum Flow Rates and Consumption for Plumbing Fixtures and Fixture Fittings " is repealed and reenacted to read:

TABLE 404.4

MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

~~Table 604, "Water Distribution System Design Criteria Required Capacity at Fixture Supply Pipe Outlets," is repealed and reenacted to read:~~

~~TABLE 604.4~~
~~WATER DISTRIBUTION SYSTEM DESIGN CRITERIA REQUIRED CAPACITY AT FIXTURE SUPPLY PIPE OUTLETS~~

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory, private	1.5 gpm at 60 psi

Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (no metering)	0.5 gpm at 60 psi
Shower head	2.0 gpm at 80 psi
Sink Faucet	1.5 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water Closet	1.28 gallons per flushing cycle

For SI: 1 gallon = 3.785L, 1 gallon per minute = 3.785 L/m,
1 pound per square inch = 6.895 kPa.

a. A handheld shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

~~(h) Section 610, "Disinfection of potable water system," is repealed.~~

(i) Section 605.3 is amended by adding a new paragraph to read:

Water service line pipe between the water meter and building shall be Type K copper if it is in the public right of way, a public utility easement, or on other public property.

(**) Section 610, "Disinfection of potable water system," is repealed.

....

(q) Chapter 13, "NONPOTABLE WATER~~Gray Water Recycling~~ SYSTEMS," is deleted in its entirety.

(r) Chapter 14 , "SUBSURFACE LANDSCAPE IRRIGATION SYSTEMS," is deleted in its entirety.

(**) Table E103.3(2), "Load Values Assigned to Fixtures," is amended by the addition of a new sentence to read:

For the purpose of determining the largest instantaneous demand required in order to size a water meter~~, or for determining the amount of the plant investment fee~~, this table is repealed and replaced by Chapter 11-1-35, "Meter Size Requirements,"~~the Fixture Unit/GPM Demand Chart and PIF Computation Sheet found at Appendix A to Chapter 11-1, "Water Utility,"~~ B.R.C. 1981.

(s) Table E103.3(3), "Table for Estimating Demand," is amended by the addition of a new sentence to read:

For the purpose of determining the largest instantaneous demand required in order to size a water meter~~, or for determining the amount of the plant investment fee~~, this table is repealed and replaced by Chapter 11-1-35, "Meter Size Requirements,"~~the Fixture Unit/GPM Demand Equations and PIF Computation Sheets found at Appendix A to Chapter 11-1, "Water Utility,"~~ B.R.C. 1981.

Section 15. Chapter 4-20, is amended to add a new Section 4-20-72 "Construction and Demolition Deposit Administrative Fee," B.R.C. 1981, to read as follows:

4-20-72. - Construction and Demolition Deposit Administrative Fee.

An applicant for a building or demolition permit which requires a deposit under section 3601.2.3 of the City of Boulder Building code or section R328.2.3 of the City of Boulder Residential Code shall pay an administrative fee of $100.

Section 16. The city council deems it appropriate to repeal the *2017 City of Boulder Energy Conservation Code* and adopt by reference the *2020 City of Boulder Energy Conservation Code*. The city council orders that at least one copy of the *2020 City of Boulder Energy Conservation Code* being considered for adoption by reference in this ordinance be on file with the city clerk and open for public inspection during the business hours of the city. Such copy shall be certified to be true by the mayor and the clerk.

Section 17. The city council orders and directs the city manager to make any additional citation, renumbering, and reference changes not included in this ordinance that are necessary to properly implement this ordinance and the *2020 City of Boulder Energy Conservation Code* The city council authorizes the city manager to change the formatting and layout of the *2020 City of Boulder Energy Conservation Code*.

Section 18. The city council intends that the sections, paragraphs, clauses, and phrases of this ordinance and the codes adopted herein by references be severable. If any phrase, clause, sentence, paragraph or section of this code or the codes adopted herein by reference is declared unconstitutional or invalid by the valid judgement or decree of any court of competent jurisdiction, such unconstitutionality or invalidity does not affect any of the remaining phrases, clauses, sentences, paragraphs and sections of this code or the codes adopted herein, unless it appears to the court that the valid provisions of the section or ordinance are so essentially and inseparably connected with, and so dependent upon, the void provision that it cannot be

presumed the council would have enacted the valid provisions without the void one; or unless the court determines that the valid provisions, standing alone, are incomplete and are incapable of being executed in accordance with the legislative intent. If provision of an exception invalidates a prohibition, but the prohibition without the exception would be valid, then it is council's intent in such cases that the exception be severed and the prohibition upheld.

Section 19. This ordinance shall take effect on July 1, 2020. It shall be applied to building permit applications submitted on or after the effective date. Building permits applied for before the effective date shall be considered under the program in effect at the time of application.

Section 20. This ordinance is necessary to protect the public health, safety, and welfare of the residents of the city, and covers matters of local concern.

Section 21. The city council deems it appropriate that this ordinance be published by title only and orders that copies of this ordinance be made available in the office of the city clerk for public inspection and acquisition.

INTRODUCED, READ ON FIRST READING, AND ORDERED PUBLISHED BY TITLE ONLY this 19th day of November 2019.

Sam Weaver,
Mayor

Attest:

Lynnette Beck,
City Clerk

READ ON SECOND READING, AMENDED AND ORDERED PUBLISHED BY TITLE ONLY this 21st day of January 2020.

Sam Weaver,
Mayor

Attest:

Lynnette Beck,
City Clerk

READ ON THIRD READING, AMENDED AND ORDERED PUBLISHED BY TITLE ONLY this 18th day of February 2020.

Sam Weaver,
Mayor

Attest:

Lynnette Beck,
City Clerk

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READ ON FOURTH READING, PASSED AND ADOPTED this 3rd day of March 2020.

Sam Weaver,
Mayor

Attest:

Lynnette Beck,
City Clerk

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Appendix H

Portland, Oregon, Deconstruction Ordinance

EXHIBIT A

CHAPTER 17.106 - DECONSTRUCTION OF BUILDINGS LAW

(Chapter added by Ordinance No. 187876, effective October 31, 2016.)

Sections:

17.106.005 Short Title.
17.106.010 Purpose.
17.106.020 Definitions.
17.106.030 Authority of Director to Adopt Rules.
17.106.040 Regulations.
17.106.050 Enforcement and Penalties.
17.106.060 Right of Appeal.

17.106.005 Short Title.

Chapter 17.106 of the Portland City Code shall be known as the Deconstruction of Buildings Law.

17.106.010 Purpose.

This Chapter provides deconstruction requirements for the removal of Portland's older and more historic primary dwelling structures. The Deconstruction of Buildings Law seeks to:

A. Maximize the salvage of valuable building materials for reuse;

B. Reduce carbon emissions associated with demolition;

C. Reduce the amount of demolition waste disposed of in landfills; and

D. Minimize the adverse impacts associated with building removal.

17.106.020 Definitions.

The terms used in Chapter 17.106 are defined as provided in this section:

A. **"Certified Deconstruction Contractor"** means a contractor licensed with the Oregon Construction Contractors Board (CCB) that has successfully completed a deconstruction certification program recognized by the Bureau of Planning and Sustainability. A firm will be considered certified if at least one person currently employed by the firm is certified.

B. **"Deconstruction"** means the systematic dismantling of a structure, typically in the opposite order it was constructed, in order to maximize the salvage of materials for reuse, in preference over salvaging materials for recycling, energy recovery, or sending the materials to the landfill.

C. **"Director"** means, the Director of the Bureau of Planning and Sustainability or ~~his or her~~ their authorized designee.

D. **"Primary Dwelling Structure"** means one and two-family structures (detached and attached) based on current permitted occupancy at the time of demolition permit application. Primary Dwelling Structures do not include accessory structures such as garages or accessory dwelling units.

E. **"Recycling"** means the processing of waste materials into new products or material feed stock for products. Materials that can be recycled include but are not limited to concrete, metal piping, and asphalt roofing shingles.

F. **"Responsible Party"** means any owner or person in control of a primary dwelling structure, or their authorized agent.

G. **"Reuse"** means the utilization of a product or material that was previously installed for the same or similar function to extend its life cycle. Materials salvageable for reuse include but are not limited to cabinets, doors, hardware, fixtures, flooring, siding, and framing lumber.

17.106.030 Authority of Director.

A. The Director is hereby authorized to administer and enforce the provisions of this Chapter.

B. The Director is authorized to adopt rules, procedures, and forms to implement the provisions of this Chapter.

1. Any rule adopted pursuant to this Section shall require a public review process. Not less than 10 nor more than 30 days before such public review process, notice shall be given by publication in a newspaper of general circulation. Such notice shall include the place, time and purpose of the public review process and the location at which copies of the full set of the proposed rules may be obtained.

2. During the public review, the Director shall hear testimony or receive written comment concerning the proposed rules. The Director shall review the recommendations, taking into consideration the comments received during the public review process, and shall either adopt the proposed rules, modify or reject them. Unless otherwise stated, all rules shall be effective upon adoption by the Director and shall be filed in the Office of the Director and with the City Auditor's Portland Policy Documents repository.

C. The Director may temporarily suspend or modify the requirements of this Chapter based on a determination that such requirements are temporarily infeasible due to economic or technical circumstances. The Director's determination to temporarily suspend or modify shall be filed as a report with the City Council. The Director's determination shall be effective after the Council has accepted the report.

17.106.040 Regulations.

(Amended by Ordinance No. 188259, effective March 31, 2017.)

A. Scope. The deconstruction requirements of this Chapter apply to demolition permit applications under Chapter 24.55 of the City Code for:

1. Primary dwelling structures that were built in ~~1916~~ 1940 or earlier according to building permit records on file with the Bureau of Development Services, or if no such permit records exist, then County tax assessor information; or

2. Primary dwelling structures that have been designated as a historic resource subject to the demolition review or 120-day delay provisions of Title 33.

B. Requirements. Primary dwelling structures must be deconstructed in accordance with the provisions of this Chapter and associated administrative rules. Salvaged material may be sold, donated, or reused on site.

1. Demolition Permit Application. An application for a demolition permit under Chapter 24.55 for any primary dwelling structure shall not be considered complete unless it is accompanied by a completed Pre-Deconstruction Form provided by the Director.

2. Certified Deconstruction Contractor. Deconstruction work must be performed by a Certified Deconstruction Contractor. A Certified Deconstruction Contractor shall be assigned to the project throughout the course of deconstruction. Certified Deconstruction Contractors must comply with the requirements of this Chapter and the administrative rules. The Bureau of Planning and Sustainability will maintain on file and available to the public a list of current Certified Deconstruction Contractors.

3. Site Posting. On the first day of active deconstruction a yard sign provided by the Director when the permit is issued must be posted at the site. The sign must indicate that the structure is being deconstructed and must provide City of Portland contact information for questions or concerns.

a. The sign must remain in place throughout the course of deconstruction.

b. The sign must be placed on each street frontage of the site.

c. Signs must be posted within 5 feet of a street lot line and must be visible to pedestrians and motorists. Signs may not be posted in a public right-of-way. Signs are not required along street frontages that are not improved and allow no motor vehicle access.

4. Heavy Machinery. Heavy machinery may be used in deconstruction to assist in the salvage of materials for reuse or to remove material not required

to be salvaged for reuse. Heavy machinery may not be used in deconstruction to remove or dismantle components of buildings in ways that render building components unsuitable for salvage. For purposes of this Chapter 17.106, heavy machinery includes, but is not limited to, track hoes, excavators, skid steer loaders, or forklifts.

5. Documentation. Certified Deconstruction Contractors must maintain receipts for donation, sale, recycling, and disposal of all materials for any deconstruction project. Materials intended for reuse on site must be documented with photographs. The Director may ask that a Certified Deconstruction Contractor produce the receipts or photographs for inspection any time until the demolition permit is approved to be finaled.

6. Demolition Permit Final. A completed Post-Deconstruction Form and all documentation required in Subsection 5. above must be submitted to the Bureau of Planning and Sustainability before the Bureau of Development Services may approve a demolition permit as finaled.

C. Additional Regulations. Compliance with Chapter 17.106 does not exempt the demolition of buildings from any other requirements of the City Code, such as in Title 11 Trees, Title 24 Building Regulations, or Title 33 Planning and Zoning.

D. Exemptions. The following are exempt from the requirements of Chapter 17.106:

1. A building permit to move a structure as provided under Chapter 24.25.

2. Any primary dwelling structure that has been determined by the Bureau of Development Services to be dangerous and is required to be abated by demolition as provided in Section 29.40.030.

3. Any primary dwelling structure that the Director has determined is unsuitable for deconstruction because:

a. The structure is structurally unsafe or is otherwise hazardous to human life; or

b. Most of the material in the structure is not suitable for reuse.

E. Request for an Exemption. An applicant may request an exemption from the requirements of this Chapter under ~~Subsection 17.106.040 D.~~ Subsection 17.106.040.D.3. above by submitting a written request for exemption, together with supporting evidence, when submitting a demolition permit application.

F. Determination of an Exemption. The Director will make the final determination of exemption based on evidence submitted by the applicant as well as an inspection to confirm conditions and unsuitability. The demolition permit will not be issued until the final determination is made on the exemption request. Should the applicant

disagree with the final determination the determination may be appealed by the applicant under Subsection 17.106.060 B.

17.106.050 Enforcement and Penalties.

A. The Director may impose penalties on any responsible party who fails to comply with the requirements of this Chapter or who has misrepresented any material fact in a document or evidence required to be prepared or submitted by this Chapter.

1. A first violation of this Chapter may be subject to a penalty of up to $500.

2. A second violation of this Chapter by the same person may be subject to a penalty of up to $1,000.

3. Third and subsequent violations of this Chapter by the same person may be subject to a penalty of up to $1,500.

4. Penalties may be imposed on a per month, per day, per incident, or such other basis as the Director may determine as appropriate based upon criteria in Subsection E below.

5. Any person receiving a notice of violation shall, within 10 days of issuance of the notice, either pay to the City the stated amount of the penalty or request an appeal as provided in Section 17.106.060.

B. Heavy Machinery.

1. Improper use of heavy machinery in violation of this Chapter may be subject to a penalty of up to $10,000.

2. Any person receiving a notice of violation shall, within 10 days of issuance of the notice, either pay to the City the stated amount of the penalty or request an appeal as provided in Section 17.106.060.

C. Additional Enforcement Actions for Certified Deconstruction Contractors. The Director may impose the following additional remedies for Certified Deconstruction Contractors.

1. A first violation of this Chapter may result in removal from the list of approved Certified Deconstruction Contractors for up to 6 months.

2. A second violation of this Chapter may result in removal from the list of approved Certified Deconstruction Contractors for up to 12 months.

3. Third and subsequent violations may result in revocation of certification whereby a contractor may not apply for recertification for a period of 18 months.

4. Temporary removal from the list of approved Certified Deconstruction Contractors will expire immediately following the term of removal and will not require further action from the Director.

D. Stop Work Orders. When necessary to obtain compliance with this Chapter, the Director may issue a stop work order requiring that all work, except work directly related to elimination of the violation, be immediately and completely stopped. If the Director issues a stop work order, activity subject to the order may not be resumed until such time as the Director gives specific approval in writing. The stop work order will be in writing and posted at a conspicuous location at the site. When an emergency condition exists, a stop work order may be issued orally, followed by a written stop work order. It is unlawful for any person to remove, obscure, mutilate or otherwise damage a stop work order. Any person subject to a stop work order may seek administrative review of the order and may appeal the Director's administrative determination as provided in Subsection 17.106.060 B.

E. The Director will consider the following criteria in determining the amount of penalties or remedies to impose under this Section:

1. The nature and extent of the person's involvement in the violation;

2. Whether the person was seeking any benefits, economic or otherwise, through the violation;

4. Whether other similar prior violations have occurred with that person;

5. Whether the violation was isolated and temporary, or repeated and continuous;

6. The length of time from any prior violations;

7. The magnitude and seriousness of the violation;

8. The costs of investigation and remedying the violation;

9. Other relevant, applicable evidence bearing on the nature and seriousness of the violation.

F. If the Director assesses an enforcement penalty as described in this Section <u>against a property owner</u>, the Director ~~will~~ <u>may</u> file a statement with the City Auditor that identifies the property, the amount of the penalty, and the date from which the charges are to begin. The Auditor will then:

1. Notify the property owner of the assessment of enforcement penalties;

2. Record a property lien in the Docket of City Liens;

3. Bill the property owner monthly for the full amount of enforcement penalties owing, plus additional charges to cover administrative costs of the City Auditor; and

4. Maintain lien records until the lien and all associated interest, penalties, and costs are paid in full; and the Director certifies that all violations listed in the original or any subsequent notice of violation have been corrected.

G. Inspections. The Director may conduct inspections whenever necessary to enforce any provisions of this Chapter, to determine compliance with this Chapter or whenever the Director has reasonable cause to believe there exists any violation of this Chapter. If the responsible party is at the site when the inspection is occurring, the Director will first present proper credentials to the responsible party and request entry.

17.106.060 Right of Appeal.

A. Whenever the responsible party has been given a written notice or order pursuant to this Chapter or has been directed to make any correction, pay a penalty or to perform any act and the responsible party believes the finding of the notice or order was in error, the responsible party may have the notice or order reviewed by the Director. If a review is sought, the responsible party will submit a written request to the Director within 10 days of the date of the notice or order. Such review will be conducted by the Director. The responsible party requesting such review will be given the opportunity to present evidence to the Director. Following a review, the Director will issue a written determination. Nothing in this Section shall limit the authority of the Director to initiate a code enforcement proceeding under Title 22.

B. A responsible party may appeal the Director's written determination to the Code Hearings Officer in accordance with Portland City Code Chapter 22.10. The filing of an appeal request will remain the effective date of a penalty until the appeal is determined by the Code Hearings Officer. If, pursuant to said appeal hearing, payment of a penalty is ordered, such payment must be received by the Director or postmarked within 15 calendar days after the order becomes final.

Appendix I

Palo Alto, California, Deconstruction Ordinance

Chapter 5.24

DECONSTRUCTION AND CONSTRUCTION MATERIALS MANAGEMENT

Sections:

5.24.010 Purpose.

5.24.020 Definitions.

5.24.030 Applicability.

5.24.040 Salvage survey and reuse required.

5.24.050 Deconstruction and source separation of materials.

5.24.060 Material collection.

5.24.070 No unauthorized containers.

5.24.080 Exclusions.

5.24.090 Administration by City Manager.

5.24.100 Enforcement and penalties.

5.24.010 Purpose.

The accumulation, collection, removal and disposal of waste associated with construction, deconstruction and demolition activities must be controlled for the protection of the public health, safety and welfare, and the natural environment. State law addresses this need through the California Integrated Waste Management Act of 1989 and the California Green Building Code, which requires local governments to require fifty percent of construction debris be diverted from the landfill, and Senate Bill 1374, which requires annual reporting to the state on progress made in the diversion of construction related materials, including information on programs and ordinances implemented and quantitative data, where available. Required minimum diversion rates by project type are covered under the California Green Building Code and the city's local amendments in Title 16, Building Regulations, of this code. In 2016, the city adopted sustainability, waste diversion and climate action goals of eighty percent reduction in greenhouse gases and ninety-five percent diversion of materials from landfills by 2030. The city may adopt, implement, and enforce requirements, rules and regulations for local reuse and recycling of materials that are more stringent or comprehensive than California law, and this chapter establishes local requirements to further both state law and the city's adopted policies.

This chapter's goals are to implement best practice methods for separation, handling, and delivery of deconstruction and construction site materials to maximize the salvage of building materials for reuse, to reduce the amount of construction and deconstruction related materials disposed in landfills and to establish deconstruction and source separation requirements. The requirements of this chapter are in addition to, the requirement in Chapter 16.14 of this code to achieve a specified diversion of materials generated from an applicable construction project.

(Ord. 5472 § 2 (part), 2019)

5.24.020 Definitions.

For purposes of this chapter, terms defined in Chapter5.20 shall have the same meanings in this chapter. The following terms shall have the ascribed definition for the purposes of applying the criteria of this chapter and other chapters as referenced.

(1) "Approved facility" means a reuse, recycling, composting, or materials recovery facility which the director has determined can accept diverted materials, has obtained all applicable federal, state and local permits, and is in full compliance with all applicable regulations for reuse, recycling, composting, and/or materials recovery.

(2) "Applicant" means (a) any individual, firm, limited liability company, association, partnership, political subdivision, government agency, municipality, industry, public or private corporation, or any other entity whatsoever who applies to the city for, or who is issued, the applicable permits to undertake a construction, remodeling, or demolition project within Palo Alto, and (b) the owner of the real property that is subject to the permit.

(3) "Construction and demolition debris" or "construction and deconstruction materials" means (a) discarded materials generally considered to be non-water soluble and non-hazardous in nature (as defined by California Code of Regulations, Title 22, § 66261.3 et seq.), including but not limited to, metal, glass, brick, concrete, porcelain, ceramics, asphalt, pipe, gypsum wallboard, and lumber from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure and/or landscaping, including rocks, soil, trees, and other vegetative matter that normally results from land clearing, landscaping and development operations for a construction project; and (b) remnants of new materials, including but not limited to, cardboard, paper, plastic, wood, glass and metal from any construction, renovation and/or landscape project.

(4) "Contractor" means any person or entity holding, or required to hold, a contractor's license under the laws of the State of California, and who performs any construction, deconstruction, demolition, remodeling, renovation, or landscaping service

relating to buildings or accessory structures in the city.

(5) "Covered project" means any project that is required to comply with the provisions of this chapter, as described in Section 5.24.030.

(6) "Deconstruction" means the systematic and careful dismantling of a structure, typically in the opposite order it was constructed, in order to maximize the salvage of materials and parts for reuse and recycling.

(7) "Demolition" means the partial or complete destroying, tearing down, dismantling or wrecking of any building or structure.

(8) "Diversion" means any activity, including recycling, source reduction, reuse, deconstruction, or salvaging of materials, which causes materials to be diverted from disposal in landfills and instead puts the material to use as the same or different usable product.

(9) "Recycling" means the process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste, and returning them to the economic mainstream in the form of raw material for new or reconstituted products which meet the quality standards necessary to be used in the marketplace. This term does not include transformation as that term is defined in Public Resources Code section 40180.

(10) "Reuse" means further or repeated use of materials or items, including sale or donation of items, but not including recycling.

(11) "Reuse organization" means an organization approved by the city to provide salvage surveys and accept materials or items for reuse.

(12) "Salvage" means the controlled removal of items and material from a building, construction, or demolition site for the purpose of on- or off-site reuse, or storage for later reuse. Examples of items that may be salvaged include air conditioning and heating systems, columns, balustrades, fountains, gazebos, molding, mantels, pavers, planters, quoins, stair treads, trim, wall caps, bath tubs, bricks, cabinetry, carpet, doors, ceiling fans, lighting fixtures, electrical panel boxes, fencing, fireplaces, flooring materials of wood, marble, stone or tile, furnaces, plate glass, wall mirrors, door knobs, door brackets, door hinges, marble, iron work, metal balconies, structural steel, plumbing fixtures, refrigerators, rock, roofing materials, siding materials, sinks, stairs, stone, stoves, toilets, windows, wood fencing, lumber and plywood.

(13) "Source separated single recyclable materials" means recyclable materials that are separated from other recyclable materials or solid waste and placed in separate containers according to type or category of materials and directly marketed as a single commodity.

(Ord. 5472 § 2 (part), 2019)

5.24.030 Applicability.

This chapter shall be applicable to all residential and commercial projects that include a whole structure demolition requiring a demolition permit. However, this chapter shall not apply to those projects comprised solely of the demolition of an accessory dwelling unit, or to any project for which the completed demolition permit application was submitted to the city prior to July 1, 2020.

(Ord. 5472 § 2 (part), 2019)

5.24.040 Salvage survey and reuse required.

(a) All applicants and other persons who undertake a covered project shall complete a salvage survey provided by a reuse organization or other third party approved by the city, prior to the issuance of a demolition permit. The survey shall itemize the materials and items eligible for salvage and reuse and the estimated weights.

(b) Upon completion of the deconstruction and source separation of materials, the applicant or person responsible for the covered project shall ensure the items listed on the salvage survey are delivered to, collected by or received by, and certified by a reuse organization or other third party approved by the city, and shall submit to the city proof of delivery of salvage items in accordance with city regulations.

(Ord. 5472 § 2 (part), 2019)

5.24.050 Deconstruction and source separation of materials.

(a) All applicants and other persons who undertake a covered project where materials can be recycled or composted shall deconstruct buildings and structures in a manner to divert the maximum feasible amount of materials and debris from disposal in landfills. All construction and deconstruction materials shall be source separated. Materials to be source separated for recycling include, but are not limited to, steel, glass, brick, concrete, asphalt, roofing material, pipe, gypsum, sheetrock, lumber, wood, pallets, rocks, sand, soil, clean cardboard, paper, plastic, carpet, wood and metal scraps. Materials to be composted include, but are not limited to, trees, shrubs, plant cuttings, food scraps, and other material as designated by the city.

(b) All persons undertaking a covered project shall submit proof of reuse, recycling and composting in accordance with city regulations.

(c) The city, or its collector at city's direction, shall be authorized to inspect, upon reasonable notice, and audit individual

waste streams generated at covered projects to determine compliance with this section.

(Ord. 5472 § 2 (part), 2019)

5.24.060 Material collection.

Projects using a container provided by the city's collector pursuant to the provisions of Chapter 5.20 shall be deemed to have complied with the requirement to take construction and deconstruction related waste and source separated materials to an approved facility. Persons using any other method of collection shall dispose of such debris at an approved facility in accordance with city regulations.

(Ord. 5472 § 2 (part), 2019)

5.24.070 No unauthorized containers.

No person other than the city's collector may place containers within Palo Alto.

(Ord. 5472 § 2 (part), 2019)

5.24.080 Exclusions.

The provisions of this chapter shall not apply to the following:

(a) Dangerous Structures. Any building or structure that has been determined to be dangerous, structurally unsafe or otherwise hazardous to human life, and is required to be abated by demolition.

(b) No Suitable Materials. Any building or structure that does not have materials that are suitable for reuse, recycling, or compost, as determined by the Director of Public Works. Materials unsuitable for reuse, recycling, or compost include insulation, painted or treated wood, rubber, and non-recyclable plastics.

(c) De Minimus Exception. The Director of Public Works may waive any of the requirements of this chapter if documentation satisfactory to the director is provided to establish that the materials are not reusable, recyclable or compostable, the materials are incidental in quantity, or providing appropriate containers at the particular site would be unduly difficult.

(Ord. 5472 § 2 (part), 2019)

5.24.090 Administration by City Manager.

(a) The City Manager shall adopt written rules and regulations, not inconsistent with this chapter, as may be necessary for the proper administration and enforcement of this chapter.

(b) The City Manager shall resolve all disputes concerning the administration or enforcement of this chapter, and his or her decision shall be final.

(Ord. 5472 § 2 (part), 2019)

5.24.100 Enforcement and penalties.

(a) The Director of Public Works shall have primary responsibility for enforcement of this chapter. The Director of Public Works is authorized to take any and all other actions reasonable and necessary to enforce this chapter.

(b) Violation of any provision of this chapter shall be subject to the provisions and penalties set forth in Title 1 of the Municipal Code unless otherwise specified.

(c) The remedies and penalties provided in this section are cumulative and not exclusive.

(Ord. 5472 § 2 (part), 2019)

Appendix J

Austin, Texas, C&D Recycling Ordinance

ORDINANCE NO. 20151119-098

AN ORDINANCE AMENDING CITY CODE CHAPTERS 15-6 (*SOLID WASTE SERVICES*) AND 25-11 (*BUILDING, DEMOLITION, AND RELOCATION PERMITS; SPECIAL REQUIREMENTS FOR HISTORIC STRUCTURES*) RELATING TO DIVERSION AND DISPOSAL OF CONSTRUCTION AND DEMOLITION MATERIALS; AND CREATING A PENALTY.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

PART 1. City Code Section 15-6-1 (*Definitions*) is amended to add new definitions of "Average Diversion Rate", "Austin Metro Area", "Beneficial Use", "Deconstruction", "Project", "Project Disposal Rate", "Project Diversion Rate", and "Qualified Processor" to read as follows and to renumber the remaining definitions accordingly:

§ 15-6-1 DEFINITIONS.

(1) Average Diversion Rate means the percentage of all inbound commingled material over a period of time that a facility diverts for beneficial use.

(2) Austin Metro Area means the five-county metropolitan area that surrounds the City of Austin.

(3) Beneficial Use means productive use of materials reclaimed through separation, processing, deconstruction, or other means, and made available for recycling or reuse, but does not include placement in a disposal facility, used as daily cover in a disposal facility, or used for energy recovery.

(10) Deconstruction means dismantling or extracting reusable materials from a project prior to or instead of traditional demolition.

(21) Processor means a facility that sorts, crushes, grinds, composts, or recycles materials.

(22) Project means activities described in Subsection 25-11-39(C) (*Construction and Demolition Materials Diversion Required*).

(23) Project Disposal Rate means the total pounds of material generated by a project and disposed per square foot of the project.

(24) Project Diversion Rate means the percentage of the materials generated by the project and diverted for beneficial use onsite or offsite.

(25) Qualified Processor means a facility that meets the qualifications in Division 2 of Article 9 (*Construction and Demolition Materials Diversion Program*).

PART 2. City Code Chapter 15-6 (*Solid Waste Services*) is amended to add a new Article 9 (*Construction and Demolition Materials Diversion Program*) to read as follows.

DIVISION 1 PROGRAM REQUIREMENTS.

§ 15-6-150 COMPLIANCE REQUIRED.

(A) Except as provided in Section 15-6-156 (*Waiver*), a permittee subject to Section 25-11-39 (*Construction and Demolition Materials Diversion Required*) shall comply with this Article.

(B) A permittee complies with this Article if the permittee meets or exceeds either the project disposal rate in Section 15-6-151 (*Project Disposal Rates*) or the project diversion rate in Section 15-6-152 (*Project Diversion Rates*).

(C) In this chapter, materials includes non-hazardous materials that are directly, or indirectly, by-products of a project including, but not limited to, building components, concrete, corrugated cartons, gypsum wallboard, metal, paper, paving, plastics, and wood; but does not include excavated soil, stone, land-clearing debris, asbestos-containing materials, lead-containing materials, and similar items.

(D) Building components include, but are not limited to, doors, windows, fixtures, structural members, architectural parts, masonry, and similar items.

§ 15-6-151 PROJECT DISPOSAL RATES.

(A) Beginning October 1, 2016, a permittee or its agents may not dispose more than 2.5 pounds of materials per square foot of the project.

(B) Beginning October 1, 2020, subject to approval by City Council of the report required in Section 15-6-157(A), a permittee or its agents may not dispose more than 1.5 pounds of materials per square foot of the project.

(C) Beginning October 1, 2030, subject to approval by City Council of the report required in Section 15-6-157(B), a permittee or its agents may not dispose more than 0.5 pounds of materials per square foot of the project.

§ 15-6-152 PROJECT DIVERSION RATES.

(A) Beginning October 1, 2016, a permittee or its agents shall divert a minimum of 50 percent of materials generated by the project for beneficial use.

(B) Beginning October 1, 2020, subject to approval by City Council of the report required in Section 15-6-157(A) , a permittee or its agents shall divert a minimum of 75 percent of materials generated by the project for beneficial use.

(C) Beginning October 1, 2030, subject to approval by City Council of the report required in Section 15-6-157(B), a permittee or its agents shall divert a minimum of 95 percent of materials generated by the project for beneficial use.

§ 15-6-153 PROJECT DISPOSAL AND DIVERSION REPORT.

(A) A permittee shall provide the department the report required by subsection (B) at the same time it requests final inspections to complete the building or demolition permit requirements.

(B) A report must include:

(1) the quantity of materials generated by the project and put to beneficial use onsite;

(2) the quantity of materials delivered to a qualified processor;

(3) the quantity delivered to a processor or end-user and diverted for beneficial use;

(4) the quantity of materials delivered to a processor or end-user and disposed;

(5) the quantity of materials delivered directly to a disposal facility; and

(6) any other information required by the department

§ 15-6-154 CALCULATIONS.

The department will establish by rule the calculations for project disposal and diversion rates.

§ 15-6-155 QUALIFIED PROCESSOR.

A permittee may deliver materials to a qualified processor to meet the rates established in Section 15-6-151 (*Project Disposal Rates*) or Section 15-6-152 (*Project Diversion Rates*)

§ 15-6-156 WAIVER.

(A) A permittee may request a waiver from the disposal rates in Section 15-6-151 (*Project Disposal Rates*) and the diversion rates in Section 15-6-152 (*Project Diversion Rates*) for a project subject to this Chapter.

(B) A permittee's request for a waiver must be submitted on a form approved by the director and include a project disposal and diversion report required by Section 15-6-153 (*Project Disposal and Diversion Report*).

(C) The director may grant a waiver if the permittee shows a good faith effort to divert materials generated by the project but could not meet the disposal or diversion rate requirements because the materials are not marketable in the Austin Metro Area.

§ 15-6-157 REPORTS.

(A) The City Manager must provide a report concerning the economic impact of existing disposal and diversion rates on household affordability and an assessment of future markets for reuse of construction and demolition materials on or before April 2, 2020.

(B) The City Manager must provide a report concerning the economic impact of existing disposal and diversion rates on household affordability and an assessment of future markets for reuse of construction and demolition materials on or before April 2, 2030.

(C) The City Council may approve each report by resolution

DIVISION 2 QUALIFIED PROCESSORS.

§ 15-6-160 REGISTRATION REQUIRED.

(A) The department may register a facility that meets the requirements in Section 15-6-161 (*Qualified Processor Requirements*) as a qualified processor.

(B) A registration is effective for two years.

(C) To remain registered, the facility owner must submit a renewal application at least 90 days before the expiration of the registration.

§ 15-6-161 QUALIFIED PROCESSOR REQUIREMENTS.

(A) A facility is a qualified processor if it meets the following criteria:

(1) complies with all federal, state, and local regulations, including any permit requirements;

(2) weighs the items described in Subsection (B);

(3) provides the information described in Subsection (C);

(4) is located in the Austin Metro Area;

(5) authorizes an inspection of its facility by the department; and

(6) agrees to the requirements described in Section 15-6-163 (*Audit Requirements*).

(B) A qualified processor must be able to weigh:

(1) inbound mixed materials;

(2) materials reclaimed for use from mixed materials; and

(3) residual material disposed.

(C) A qualified processor must be able to provide customers with documentation that shows the date, quantity of materials, and the disposition of materials, mixed or separated, received from projects subject to this Article. Amounts may be calculated based on tons, or in a manner provided for in the Rules.

(D) A qualified processor must submit a report each six months to the director that includes the average diversion rate, the types of materials recovered, and the beneficial uses for the materials. The report is due no later than 30 days after the end of each six month period.

(E) A qualified processor must have its average diversion rate validated in accordance with Section 15-6-162 (*Average Division Rate Calculation and Validation*).

§ 15-6-162 AVERAGE DIVERSION RATE CALCULATION AND VALIDATION.

(A) A qualified processor's average diversion rate is calculated as the tons of materials reclaimed divided by the tons materials processed and multiplied by 100 percent.

(B) A person is authorized to validate a qualified processor's average diversion rate if the person:

(1) has operational or consulting experience in waste management, building design, construction, demolition, renovation, environmental protection, or accounting;

(2) completes City-approved training, as may be required by the director, on construction and diversion material recycling, Zero Waste, or other related topics; and

(3) is approved by director.

(C) A person qualified under this Section to validate average diversion rates may not charge fees contingent upon a City registering a facility as a qualified processor.

(D) An employee, owner, or other agent of the qualified processor may not validate the average diversion rate for the qualified processor.

§ 15-6-163 AUDIT REQUIREMENTS.

(A) A qualified processor shall make its records available for audit by the department during regular business hours.

(B) Failure to comply with Subsection (A) is cause to suspend the qualified processor's registration

§ 15-6-164 SUSPENSION.

(A) The department may suspend a qualified processor's registration if the qualified processor fails to comply with the requirements in this division.

(B) Prior to suspending a registration, a written notice of proposed suspension must be sent to the facility owner and operator.

(C) The notice described in Subsection (B) will include the violation and a time period to correct the violation.

(D) If the facility does not correct the violation within the time period stated in the notice, the department will notify the facility owner and operator that the facility is no longer a qualified processor.

(E) A facility owner or operator may appeal the decision to suspend the qualified processor's registration. An appeal must be filed with the director no later than 20 days after the date the registration was suspended. The appeal must identify each alleged point of error, facts, and evidence supporting the appeal and reasons why the suspension should be set aside. The appeal must be signed by the facility owner or operator. The director must provide a written response to the appeal that affirms, reverses, or modifies the suspension within 30 days from the date the appeal is received by the director.

DIVISION 3. ENFORCEMENT

§ 15-6-170 ENFORCEMENT.

(A) A permittee who fails to submit the report required in Section 15-6-153 (*Project Disposal and Diversion Rate Report*) commits an offense punishable as described in Section 1-1-99 (*Offenses; General Penalty*).

(B) A permittee who fails to submit a substantially complete report required in Section 15-6-153 (*Project Disposal and Diversion Rate Report*) commits an offense punishable as described in Section 1-1-99 (*Offenses; General Penalty*).

(C) A permittee who fails to meet the requirements in Section 15-6-151 (*Project Disposal Rates*) or Section 15-6-152 (*Project Diversion Rates*) commits an offense punishable as described in Section 1-1-99 (*Offenses; General Penalty*).

(D) A culpable mental state is not required, and need not be proved.

(E) Each day a permittee fails to submit a report is a separate offense.

PART 3. City Code Section 15-6-44 (*Reporting Requirements*) is amended to read as follows:

§ 15-6-44 REPORTING REQUIREMENTS.

(A) A licensee shall maintain a list of the containers used for the collection, storage, or disposal of solid waste that are owned or serviced by the licensee, with the customer number and the location of each container.

(B) A licensee shall file a quarterly report of the number of containers it services in the city. A licensee shall submit the container fee required by this article with a report filed under this section.

(C) A licensee who provides solid waste collection service under Article 3 (*Private Solid Waste Collection Service*) or recycling service under Article 5 (*Universal Recycling*) shall file a report with the Austin Code Department [~~Compliance~~]. The report shall be on a form provided by the Austin Code Department [~~Compliance~~]. The report shall be filed with the Austin Code Department [~~Compliance~~] semi-annually on or before the last business day in January and July of each calendar year. Beginning with the report due in January, 2017, for the six-month reporting period that ends December 31, 2016, t[~~T~~]he report shall contain the following information:

(1) the amount in tons of solid waste, recyclables, and organic materials (but excluding construction and demolition materials) [~~each of the following types of material~~] hauled to:

(a) landfills [~~solid waste~~];

(b) recycling facilities [~~recyclables~~]; and

(c) organic materials processing facilities [~~collected and transported to a receiving facility~~];

(2) the amount in tons of construction and demolition materials hauled directly to:

(a) landfills;

(b) recycling facilities; and

(c) organic materials processing facilities; and

(3) other information required by the Austin Code Department [~~Compliance~~].

PART 4. City Code Chapter 25-11 (*Building, Demolition, and Relocation Permits; Special Requirements for Historic Structures*) is amended to add a new Section 25-11-39 (*Construction and Demolition Materials Diversion Required*) to read as follows.

§ 25-11-39 CONSTRUCTION AND DEMOLITION MATERIALS DIVERSION REQUIRED.

(A) Except as provided in Subsection (D), each person that applies for a building permit or demolition permit for activities described in Subsection (C) must

acknowledge the person's need to comply with this Section and Chapter 15-6, Article 9 (*Construction and Demolition Materials Diversion Program*) before a building or demolition permit is issued.

(B) This section is applicable in the City's zoning jurisdiction.

(C) Except as provided in Subsection (D), construction and demolition materials diversion is required for

(1) construction projects that exceed 5,000 square feet of new, added, or remodeled floor area; and

(2) beginning October 1, 2019, commercial and multifamily projects that require a demolition permit.

(D) Construction and demolition materials diversion is not required for the following activities:

(1) projects for which only mechanical, electrical, or plumbing permits are required; or

(2) work for which a building or demolition permit is not required.

PART 5. The Council directs the City Manager to provide a report concerning the economic impact of these requirements on household affordability and an assessment of the markets for reuse of construction and demolition materials. The report should be provided to the City Council four years from the effective date of this ordinance.

PART 6. This ordinance takes effect on October 1, 2016.

PASSED AND APPROVED

November 19, 2015 §
§
§

Steve Adler
Mayor

APPROVED:

Anne L. Morgan
City Attorney

ATTEST:

Jannette S. Goodall
City Clerk

Appendix K

Massachusetts Department of Environmental Protection C&D FAQs

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs
Department of Environmental Protection
One Winter Street Boston, MA 02108 • 617-292-5500

Frequently Asked Questions About the
Massachusetts Construction and Demolition Materials Waste Bans
June 2020

1. What are the "Waste Bans"?

A. The "Waste Bans" are prohibitions on the disposal, transfer for disposal, or contracting for disposal of certain hazardous and recyclable items at solid waste facilities in Massachusetts. The waste bans are located in the state's solid waste facility management regulations at 310 CMR 19.017. For general information on waste bans, please refer to the MassDEP web site at https://www.mass.gov/guides/massdep-waste-disposal-bans.

2. Which C&D materials are subject to the Waste Bans?

A. The following construction materials are banned from disposal under 310 CMR 19.017: asphalt pavement, brick, concrete, metal, wood and clean gypsum wallboard. Note that wood may be disposed of at municipal waste combustion facilities.

3. When did the disposal ban on C&D materials take effect?

A. The disposal bans on asphalt pavement, brick, concrete, metal and wood took effect on July 1, 2006. The disposal ban on clean gypsum wallboard took effect on July 1, 2011. By now, all solid waste facility waste ban compliance plans should have been modified to address how these materials are handled when they show up at the facility.

4. Why ban the disposal of construction and demolition debris?

A. Increasing recycling and other diversion of C&D materials helps support development of in-state processing businesses and preserves valuable, limited disposal capacity in the Commonwealth. MassDEP's Draft 2030 Solid Waste Master Plan (SWMP) sets a goal of reducing disposal of construction and demolition materials by 260,000 tons by 2030, more than double current C&D recycling tonnage.

5. Is all construction and demolition debris banned from disposal?

A. No, only asphalt pavement, brick, concrete, metal, wood and clean gypsum wallboard are subject to the ban. (Please note that wood is not banned from municipal waste combustors.) In addition to the C&D materials subject to the Waste Ban, other materials such as cardboard, whole tires, CRTs/electronics, white goods, brush and stumps, which

are often generated during construction and demolition projects, are also subject to their own Waste Bans. Furthermore, in the spirit of the aggressive waste reduction goals articulated in the Draft 2030 Solid Waste Master Plan, MassDEP encourages the re-use and recycling of all C&D materials to the greatest extent possible, even those not subject to the current Waste Bans. That might include such materials as asphalt shingles, bulky rigid plastic, mattresses and carpet, to name just a few.

6. Where will the construction and demolition debris go?

A. MassDEP worked with a "Construction and Demolition Debris Subcommittee" to develop the disposal prohibition of certain construction and demolition debris material. The C&D Subcommittee was comprised of architects/engineers, building owners, contractors, haulers, C&D processors, landfill owners, transfer station owners, municipalities, environmental groups, trade associations, law firms and consultants. The C&D Subcommittee identified that there are recycling and reuse markets for asphalt pavement, brick, concrete, metal, wood and clean gypsum wallboard and that these types of materials are routinely diverted from disposal. To learn more about markets, please refer to the "Construction Materials" webpage of MassDEP's technical assistance organization, RecyclingWorks Massachusetts found at the following link: https://recyclingworksma.com/how-to/materials-guidance/construction-materials/. Among other topics, it covers "How do C&D materials get recycled?" and "What happens after C&D materials are recycled?". There's also a link to the C&D Best Management Practices (BMP) guide developed by RecyclingWorks: https://recyclingworksma.com/construction-demolition-materials-guidance/. The RecyclingWorks BMP Guide describes a range of options for properly managing C&D debris including deconstruction, material re-use, C&D recycling, and source separation.

7. Won't the disposal ban cost more?

A. Construction and demolition debris processors provide cost-competitive options over disposal for managing mixed loads of construction and demolition debris. Recyclers provide even stronger cost-competitive options for managing materials that have been separated at the job site. The RecyclingWorks "Construction Materials" webpage referenced above (https://recyclingworksma.com/how-to/materials-guidance/construction-materials/) also includes examples of recent successful C&D material recycling case studies.

8. What do solid waste facilities need to do to comply?

A. All solid waste facilities are required to have a written waste ban compliance plan approved by the appropriate regional MassDEP office in which they operate. In addition, since 2020 the C&D Handling Facilities must demonstrate that they are operating in compliance with the MassDEP C&D Minimum Performance Standard. For more information about the C&D Minimum Performance Standard, please refer to the following:

- ∞ C&D Minimum Performance Standard: https://www.mass.gov/doc/minimum-performance-standard-for-construction-demolition-handling-facilities/download
- ∞ C&D Minimum Performance Standard FAQs: https://www.mass.gov/doc/frequently-asked-questions-faq-minimum-performance-standard-for-cd-handling-facilities/download

Please note that all C&D Handling Facilities will be required to submit revised Waste Ban Compliance Plans addressing the C&D MPS Performance Criteria either:

- ∞ At the time new Waste Ban Materials are added to SWM regulation (310 CMR 19.017), or
- ∞ At the time of ATO permit renewal/modification, whichever comes first.

(MassDEP's current schedule calls for promulgating revised waste ban regulations in fall 2020.)

If unsure which form to use for submitting a new or modified Waste Ban Compliance Plan, please reach out to the MassDEP Solid Waste Division Section Chief for the region in which your facility is located. If unsure of the region in which the facility is located, please refer to the "Find Your Region" tool at the following link: https://www.mass.gov/doc/massdep-regional-office-locations-communities-served.

9. Is there an acceptable level of banned C&D materials that can be disposed of?

A. Under the waste ban regulations, there is no acceptable level of banned materials that can be disposed of. However, for purposes of waste ban inspections and monitoring by solid waste facilities, MassDEP has established "action levels" for certain materials on a volume basis. In that context, the action level for all construction materials combined is 20 percent by volume of any given load. Any loads that contain more than this amount of banned material for disposal should be identified as failed loads under a solid waste facility's waste ban plan and treated in accordance with that facility's waste ban plan.

10. My town's transfer station does not receive a lot of construction and demolition debris. Do we need to separate the banned C&D materials?

A. No, if a transfer station receives loads of construction and demolition debris in vehicles with a capacity of 5 (five) cubic yards or less, then that transfer station does not need to separate those items nor does it need to conduct any comprehensive inspections or record-keeping of those loads. That transfer station can consolidate loads into a larger container and send the larger container to another solid waste facility for disposal. Please note that this transfer station still needs to conduct on-going monitoring for other banned materials.

11. My transfer station only takes loads in vehicles or containers with a capacity of 5 (five) cubic yards or less. However, our consolidated loads exceed the 20 percent action level for banned C&D materials. Does the next solid waste facility have to reject our consolidated load because it exceeds the 20 percent action level?

A. No, this aggregated load may be sent to a permitted solid waste facility for disposal and not be subject to MassDEP waste ban enforcement for asphalt pavement, brick, concrete, metal and/or wood disposal. Please note that this exemption does not apply to other banned materials.

   MassDEP will provide all solid waste facilities with a list of solid waste transfer stations that have approved waste ban compliance plans that state the transfer station does not receive solid waste in vehicles or containers with a capacity of greater than 5 (five) cubic yards.

12. My transfer station receives loads of construction and demolition debris that may contain banned C&D materials in vehicles or containers greater than 5 (five) cubic yards. Can we consolidate the loads and send them to a construction and demolition debris processing facility?

A. Yes, loads containing banned C&D materials may be transferred to facilities that have an approved waste ban compliance plan that includes diversion of these materials for recycling or reuse, or can demonstrate that they will not accept restricted material for disposal, or further transfer for disposal in accordance with the C&D Minimum Performance Standard (https://www.mass.gov/doc/minimum-performance-standard-for-construction-demolition-handling-facilities/download). Your facility's waste ban compliance plan should specify how your facility will handle these materials.

   Loads from transfer stations that accept greater than 5 (five) cubic yard loads and contain 20 percent or more by volume of asphalt pavement, brick, concrete, metal, or wood may not be sent for disposal. Please note that wood may be disposed of at combustion facilities.

13. What must a C&D Handling Facility do when clean gypsum wallboard arrives in a mixed C&D waste load?

A. In order to maintain compliance with the requirement in approved Waste Ban Compliance Plans to separate clean gypsum wallboard to the maximum extent possible for recycling, the following measures are to be taken:
   1. Loads that include clean gypsum wallboard must be sorted, to the extent it can be done safely, to remove clean gypsum wallboard to the greatest extent possible prior to any mechanical processing of the C&D waste load.
   2. Facilities will not be allowed to transfer (including transfer to another C&D Handling Facility) mixed C&D waste loads that contain clean gypsum wallboard without first safely separating the clean gypsum wallboard for recycling.

3. In order to be eligible to receive mixed C&D waste loads, a C&D handling facility must implement operating procedures to safely and effectively separate clean gypsum wallboard prior to transferring or processing C&D loads.

Please refer to the Clean Gypsum Wallboard Guidance that can be found at the following link: https://www.mass.gov/doc/gypsum-wallboard-waste-ban-guidance-cd-handling-facilities/download.

14. What if a C&D processing facility receives wood that it cannot divert from disposal due to contamination?

A. A: Under the waste ban regulations, all solid waste facilities must submit waste ban compliance plans that demonstrate how they will inspect for and segregate banned materials so that they are not disposed. In some cases, C&D processing facilities may receive particular contaminated materials that they cannot recycle or otherwise divert from disposal. In these cases, the waste ban regulations provide exceptions allowing this material to be disposed with prior approval from MassDEP. However, as a general matter, C&D processors (and other solid waste facilities) are required to establish and implement waste ban compliance plans that will divert both clean and treated and painted wood from disposal on a routine basis.

15. How will the waste ban on wood apply to bulky waste collection items such as furniture that contain wood?

A. A: MassDEP's goal in banning wood from disposal is to ensure that large amounts of C&D wood and wood waste are not disposed of. Furniture such as tables, chairs, desks, etc. is not included in the waste ban.

16. I am a construction/demolition contractor, how can I comply with the ban?

A. MassDEP's construction and demolition web page (https://www.mass.gov/lists/managing-construction-demolition-cd-wastes) includes a link to RecyclingWorks Massachusetts, a technical assistance organization of MassDEP that provides assistance to Massachusetts businesses and institutions to improve recycling practices.
   - ∞ The RecyclingWorks "Construction Materials" webpage (https://recyclingworksma.com/how-to/materials-guidance/construction-materials/) includes examples of recent successful C&D material recycling case studies.
   - ∞ The RecyclingWorks "Building Materials" webpage (https://recyclingworksma.com/reuse/building-materials/) provides guidance for reuse and recycling of building materials.
   - ∞ All these webpages contain a link to the C&D Best Management Practices (BMP) guide developed by RecyclingWorks Massachusetts: https://recyclingworksma.com/construction-demolition-materials-guidance/. The RecyclingWorks BMP Guide describes a range of options for properly managing

C&D debris including deconstruction, material re-use, C&D recycling, and source separation.

17. I am a hauler, how can I comply with the ban?

A. You can locate C&D processing facilities by checking MassDEP's web page at: https://www.mass.gov/lists/massachusetts-landfills-transfer-stations-compost-sites-recycling-facilities. See the list titled "Active Handling Facilities in Massachusetts."

18. Where can I get more information on waste bans?

A. Please refer to the MassDEP web site at: https://www.mass.gov/guides/massdep-waste-disposal-bans to view the latest waste ban regulations (310 CMR 10.017) and for the "Guidance on Compliance with MassDEP's Waste Bans for Solid Waste Handling and Disposal Facilities." The Waste Ban Compliance Plan form is Appendix G to the guidance document.

Appendix L

Seattle, Washington, C&D Disposal Ban Ordinance

Council Bill Number: 117111
Ordinance Number: 123553

AN ORDINANCE relating to the solid waste system of Seattle Public Utilities; prohibiting certain recyclable concrete, bricks, and asphalt paving from disposal in construction and demolition garbage containers and railhead intermodal containers, as well as at the City's transfer stations; establishing enforcement provisions; adding Section 21.36.089 to the Seattle Municipal Code; and amending Section 21.36.922.

Status: Passed
Note: Originally referred to Seattle Public Utilities and Neighborhoods Committee on 1/18/11.
Vote: 8-0 (Excused: Burgess)
Date filed with the City Clerk: 2011/03/10
Date of Mayor's signature: 2011/03/08 (about the signature date)

Date introduced/referred to committee: 2011/02/22
Committee: Seattle Public Utilities and Neighborhoods
Sponsor: O'BRIEN
Committee Recommendation: Pass

Index Terms: SOLID-WASTE-DISPOSAL, LANDFILLS, TRANSFER-STATIONS, SOLID-WASTE, WASTE-DISPOSAL, RECYCLING, PUBLIC-REGULATIONS, CODE-ENFORCEMENT

Fiscal Note: Fiscal Note to Council Bill No. 117111

Electronic Copy: PDF scan of Ordinance No. 123553

Reference: Related: Resolution 30990

Text:

AN ORDINANCE relating to the solid waste system of Seattle Public Utilities; prohibiting certain recyclable concrete, bricks, and asphalt paving from disposal in construction and demolition garbage containers and railhead intermodal containers, as well as at the City's transfer stations; establishing enforcement provisions; adding Section 21.36.089 to the Seattle Municipal Code; and amending Section 21.36.922.

WHEREAS, City Council Resolution 30990 established new recycling goals for the City and provided direction on waste reduction and recycling programs, including those for construction and demolition wastes; and

WHEREAS, City recycling surveys have found aggregate materials, such as concrete, bricks, and asphalt paving, constitute a significant amount of construction and demolition waste material; and

WHEREAS, City recycling surveys have also found well- established, local end-markets are capable of providing for the reuse and recycling of such concrete, bricks, and asphalt paving; and

WHEREAS, since 1993 the City has required concrete, cement concrete and asphalt recycling in City public works projects; NOW, THEREFORE,

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. A new Section 21.36.089 of the Seattle Municipal Code is added as follows:

21.36.089 Concrete, bricks, and asphalt paving -- recycling required

A. Recycling Required. As of January 1, 2012, all construction and demolition sites shall separate out readily recyclable concrete, bricks, and asphalt paving for reuse on or off site and/or recycling, and such quantities of concrete, bricks, and asphalt paving shall not be deposited in construction and demolition site garbage containers for disposal at a public or private transfer station, railhead intermodal containers, or in the garbage disposal areas at the City's Recycling and Disposal Stations after that date.

B. Enforcement.

1. As of January 1, 2012, the Director of Seattle Public Utilities shall begin a program of educational outreach regarding these new recycling requirements.

2. As of January 1, 2013, civil infractions shall apply to any violation of this section pursuant to Section 21.36.922.

C. Exceptions. The recycling requirement will not apply where concrete, bricks, and asphalt paving are painted, have hazardous constituents, are difficult to separate from other materials (such as wood), are present only in very small quantities, or are generated during disaster emergency situations where disaster debris needs to be removed quickly and recycling options are not available.

Section 2. Section 21.36.922 of the Seattle Municipal Code is amended as follows:

21.36.922 Civil Infractions ((~~.~~))

A. The violation of or failure to comply with any section of this chapter identified in this section is designated as a civil infraction and shall be processed as contemplated by RCW Chapter 7.80.

B. The violation of or failure to comply with any of the following section s is a Class 1 civil infraction under RCW 7.80.120:

((~~SMC~~)) Section 21.36.415 (Discarding potentially dangerous litter), except that the maximum monetary penalty and default amount is ((~~Five Hundred Dollars ($500.00)~~)) $500 , not including statutory assessments

((~~SMC~~)) Section 21.36.420 (Unlawful dumping of solid waste)

((~~SMC~~)) Section 21.36.084 (Prohibition on use of expanded polystyrene food service products)

((~~SMC~~)) Section 21.36.086 (Compostable or recyclable food service ware required)

Section 21.36.089 (Concrete, bricks, and asphalt paving - - recycling required)

C. The violation of or failure to comply with any of the following sections shall be a civil infraction and subject as a Class 3 civil infraction under RCW 7.80.120 to a maximum monetary penalty and default amount of ((~~Fifty Dollars ($50.00)~~))$50, not including statutory assessments:

((~~SMC~~)) Section 21.36.044 (Containers required -- Nonresidential)

((~~SMC~~)) Section 21.36.082 (Commercial recycling required)

((~~SMC~~)) Section 21.36.410 (Littering)

((~~SMC~~)) Section 21.36.425 (Accumulation of solid waste)

((~~SMC~~)) Section 21.36.430 (Unlawful use of City litter receptacles)

((~~SMC~~)) Section 21.36.440 (Unlawful use of solid waste container on private property)

* * *

Section 3. This ordinance shall take effect and be in force 30 days after its approval by the Mayor, but if not approved and returned by the Mayor within ten days after presentation, it shall take effect as provided by Seattle Municipal Code Section 1.04.020.

Passed by the City Council the ____ day of _____, 2011, and signed by me in open session in authentication of its passage this _____ day of _____, 2011.

_____

President _____of the City Council

Approved by me this ____ day of _____, 2011.

_____

Michael McGinn, Mayor

Filed by me this ____ day of _____, 2011.

_____

City Clerk

(Seal)

Gabriella Uhlar-Heffner SPU Disposal Ban on Concrete, Bricks, and Asphalt Paving ORD February 6 , 2011 Version #4a

Appendix M

Solid Waste Authority of Palm Beach County, Florida
Rule 1 – Solid Waste Management Permits

RULE I

SOLID WASTE MANAGEMENT PERMITS

1 Declaration of Finding, Intent and Scope of this Rule.

1.1 The Solid Waste Authority of Palm Beach County (Authority) has adopted and implemented its Integrated Solid Waste Management Plan ("Plan") designed to comply with the planning and Resource Recovery elements of Chapter 403 Florida Statutes and Chapter 62 Florida Administrative Code, which prescribes the programs, Facilities and processes through which Solid Waste is managed within the Authority's jurisdiction.

1.2 The Palm Beach County Solid Waste Act, Chapter 2001-331, Laws of Florida (the "Act"), as amended, authorizes the Authority "…to carry out its resource recovery and/or disposal plans or programs or when necessary to carry out any other provision of [the] act, require that all wastes collected by public or private agencies from any municipality or unincorporated area of the county be transported to Authority-designated processing and disposal facilities …".

1.3 The Governing Board ("Board") of the Authority has adopted Resolution No. 2023-01 implementing the Authority's exclusive flow control powers, which Resolution shall be adopted and incorporated in this Rule in its entirety.

1.4 The Board has determined that Solid Waste Management Facilities properly located, constructed and operated by public or private entities can complement the Authority's Resource Recovery and Recycling efforts and play an integral role in managing the Solid Waste generated in Palm Beach County (the "County").

1.5 The Board has determined that Solid Waste Management Facilities improperly located, constructed and operated by public and private entities can cause Pollution, create a public or private nuisance, or unreasonably burden, either independently or in combination with other nearby activities, nearby residents, businesses, or institutions and thereby negatively affect the health, safety and welfare of those residents.

1.6 The Board has determined that Solid Waste Management Facilities intended principally for the management of Waste Generated Outside of but Existing in the County do not complement the Authority's Resource Recovery and Recycling efforts, do not serve the Solid Waste Management needs of the County's residents and businesses, and even properly operated, result in additional traffic, noise and other impacts; create the potential for Pollution and public or private nuisance; and, therefore require burdensome oversight without any benefit to the residents and businesses of the County.

1.7 In accordance with the Act and Indenture of Trust dated December 1, 1984, as supplemented and amended, the Authority may issue Permits allowing public or private agencies to operate, maintain, construct, expand, or modify a Resource Recovery and/or Solid Waste Management Facility provided that the Authority shall not grant such Permit if it will adversely affect the revenue of the Authority or its continuing ability to provide funds to pay its outstanding debt obligation, or if it will adversely impact the ability of the Authority to comply with the countywide Comprehensive Solid Waste Management Plan required by the Act.

1.8 In accordance with Section 12 of the Act, no Person shall operate, maintain, construct, expand, or modify any Resource Recovery and/or Solid Waste Management Facility without first having applied for and received a valid Operation Permit from the Authority.

1.9 In accordance with the provisions of Chapter 403, Florida Statutes, as amended, and the Act, the intent and scope of this Rule is as follows:

1.9.1 Promote the health, safety and welfare of the residents of the County, and to preserve the air, land, and water resources of the County.

1.9.2 Complement the Authority's efforts in the recovery of Recyclable Materials from Solid Waste and the subsequent Recycling and/or beneficial use of those materials through the permitting of public and private Solid Waste Management Facilities.

1.9.3 Govern all Solid Waste Management matters set forth herein.

1.9.4 Ensure that permitted Solid Waste Management Facilities Operate in a manner that is consistent with the Plan, the Act, Authority Resolutions and Rules, and Federal, State and local laws, ordinances, and regulations.

1.9.5 Ensure that no Permit shall be issued that in the Authority's sole determination will pose a negative financial or operational impact on the Authority or its ability to carry out the provisions of the Act or meet its legal, contractual, or financial obligations, including its bond covenants.

1.9.6 Ensure that no Permit shall be issued without reasonable assurance that the construction and Operation of the Facility will not cause Pollution, create a public or private nuisance, or unreasonably burden, either independently or in combination with other nearby activities, the nearby residents, businesses, or institutions thereby negatively affecting the health, safety and welfare of those residents.

1.9.7 Ensure that no Permit shall be issued allowing for public or private entities to operate, maintain, construct, expand, or modify a Resource Recovery and/or Solid Waste Management Facility that is principally intended to manage Solid Waste generated outside of the County.

1.9.8 Ensure the application of any other permit requirements of the Authority or other agencies with jurisdiction have been met by the permit applicant.

2 Definitions.

2.1 When used in this Rule or any Permit issued pursuant to this Rule, and unless the context clearly indicates otherwise, the term:

(a) "Agricultural Wastes" means the Solid Wastes resulting from Normal Farming Operations, the raising and/or slaughtering of animals, and the processing of animal products, orchard, and field crops, which are stored, transported, or disposed of as an unwanted waste material.

(b) "Application Fee" means the following as applicable:
i) Initial one-time application fee ($1,000.00); or
ii) Permit transfer fee ($1,000.00); or
iii) Permit modification fee ($500.00).

(c) "Authority" means the Solid Waste Authority of Palm Beach County.

(d) "Backyard Composting" means the Composting of organic Solid Waste, such as grass clippings, leaves or food waste generated on a residential property by the resident of a single family or a distinct multi-family residential unit where the Composting and subsequent reuse of the Compost occurs solely on the property. This term also applies to the owner/operator of a commercial enterprise, such as a restaurant or golf course, that engages in a similar activity. To meet this definition, the organic Solid Waste processed must consist solely of organic Solid Waste generated on the property and may not include organic Solid Waste brought onto the property from any other location within or outside of Palm Beach County.

(e) "Best Management Practices" means a published document prepared by a Federal, State or local agency, an academic institution or a recognized industry organization outlining methods or techniques found to be most effective in managing or Recycling waste, while making optimum use of a resource.

(f) "Biohazardous Waste" means any Solid Waste or liquid waste which may present a threat of infection to humans. The term includes, but is not limited to, nonliquid human tissue and body parts; laboratory and veterinary waste

which contains human disease-causing agents; discarded sharps; human blood; human blood products; and body fluids.

(g) "Clean Debris" means any Solid Waste which is virtually inert, and which is not a Pollution threat to ground or surface waters and is not a fire hazard and which is likely to retain its physical and chemical structure under expected conditions of Disposal or use. The term includes uncontaminated concrete, including embedded pipe or steel, brick, glass, ceramics and any wastes designated by the Department.

(h) "Clean Wood" means unpainted, non-treated wood scraps from Facilities manufacturing materials used for construction of structures or their components and unpainted, non-treated wood pallets, provided the wood scraps and pallets are separated from other Solid Waste.

(i) "Closure" means the cessation of Operation of a Solid Waste Management Facility and the act of securing such a Facility so that it will pose no significant threat to the health, safety and welfare of nearby residents, properties or the environment.

(j) "Competing Disposal Facility" shall mean any Disposal Facility, including but not limited to a landfill, waste-to-energy Facility, incinerator, Volume Reduction Facility, or other Facility engaged in the physical, chemical, or biological conversion of Solid Waste generated in Palm Beach County or Waste Generated Outside of but Existing in the County which diverts waste and/or revenue from the Authority, or otherwise negatively impacts the Authority's revenues.

(k) "Compost" means Solid Waste which has undergone biological decomposition of organic matter, and has been disinfected using Composting or similar technologies, and has been stabilized to a degree which is potentially beneficial to plant growth and which is used as a soil amendment, artificial top soil, growing medium amendment or other similar uses.

(l) "Composting" means the process by which biological decomposition of organic Solid Waste is actively managed under controlled aerobic conditions, and which stabilizes the organic fraction into a material which can easily and safely be stored, handled, and used in an environmentally acceptable manner. The presence of anaerobic zones within the composting material will not cause the process to be classified as other than composting. Simple exposure of Solid Waste under uncontrolled conditions resulting in natural decay is not composting.

(m) "Consent Agreement" means a binding written agreement between the Authority and a permittee to resolve potential Permit violations without admission of guilt or liability. A consent agreement may include stipulations

for corrective actions by the permittee to address deficiencies or potential Permit violations.

(n) "Construction and Demolition Debris" means Solid Waste generally considered to be not water soluble and nonhazardous in nature, including, but not limited to, steel, glass, brick, concrete, asphalt roofing materials, pipe, gypsum wallboard, and lumber. The term also means Land Clearing Debris from a construction project

(o) "County" means Palm Beach County, Florida.

(p) "Department" means the State of Florida Department of Environmental Protection or any successor or agency performing a delegated or like function.

(q) "Disposal" means the disposition of Solid Waste by placing of Solid Waste materials on the land in a way that constitutes final disposition.

(r) "Executive Director" means the Executive Director of the Authority or designee.

(s) "Facility" means all contiguous land, structures, or other appurtenances and improvements on the land for the Processing or Storage of Solid Waste or Recyclable Materials. A Facility may consist of several Operational units.

(t) "Garbage" means all kitchen and table food waste, animal or Vegetative Waste that is associated with or resulting from the Storage, preparation, cooking, or handling of food materials.

(u) "Generation" means the act or process of producing Solid Waste or Recyclable Materials.

(v) "Governing Board of the Authority" means the Board of the Authority as defined in the Palm Beach County Solid Waste Act.

(w) "Health Department" means the Florida Department of Health in Palm Beach County, or any successor agency performing a like or delegated function.

(x) "Land Clearing Debris" means tree remains, trees, and other vegetative matter which normally results from land clearing or land development operations for a construction project. Land Clearing Debris does not include Yard Trash.

(y) "Municipality" means all incorporated municipalities or special taxing districts exercising municipal powers in relation to collection and Disposal of Solid Waste, lying and being in Palm Beach County, Florida.

(z) "Normal Farming Operations" means the customary and generally accepted activities, practices, and procedures that farmers adopt, use, or engage in during the production and preparation of poultry, livestock, and associated farm product; and in the production, harvesting, or packaging of agricultural crops which include agronomic, horticultural, and silvicultural crops. Included are the management, collection, Storage, Composting, transportation, and utilization of organic agricultural waste, manure, and materials solely derived from agricultural crops.

(aa) "Notice of Violation" means a notice sent to a permittee indicating that the Authority has identified actions or deficiencies that are in violation of Permit Conditions, Authority Rules, or other applicable laws. A Notice of Violation may serve as the basis for suspension or revocation of a Permit or enforcement action under the provisions of the Palm Beach County Solid Waste Act or other applicable law.

(bb) "Operation" means the Storage, transfer, Processing, or treatment of Solid Waste or Recyclable Materials at and by a Solid Waste Management Facility authorized or permitted by the Authority.

(cc) "Operation Permit" means the legal authorization granted by the Authority to operate or maintain any Solid Waste Management Facility for a specified period of time.

(dd) "Palm Beach County Solid Waste Act" or "the Act" means Chapter 2001-331, Laws of Florida and any subsequent amendments.

(ee) "Permit" means an Operation Permit as defined herein.

(ff) "Permit Condition" means a statement or stipulation which is issued with or incorporated by reference into a Permit and which must be complied with by the Permit applicant.

(gg) "Permit Fee" means a recurring Permit renewal fee of $1,000.00 payable on or before January 1st of each calendar year.

(hh) "Person" means any and all persons, natural or artificial, including any individual, firm or association, facility or any municipal or private corporation organized or existing under the laws of the State of Florida or any other state and any County or governmental agency of this state or the federal government.

(ii) "Plan" means the Integrated Solid Waste Management Plan of the Solid Waste Authority of Palm Beach County, as adopted by the Governing Board of the Authority.

(jj) "Pollution" means the presence on the land, in the atmosphere, or the surface or ground waters in the state of any substances, contaminants, noise, or manmade or man-induced impairment of air, land, or waters or the alteration of the chemical, physical, biological, or radiological integrity of air, land, or water, in quantities or at levels which are or may be potentially harmful or injurious to human health, safety or welfare, animal or plant life, or property or which unreasonably interfere with the enjoyment of life or property, including outdoor recreation unless authorized by applicable law.

(kk) "Processing" means the act of modifying or altering the nature of Solid Waste materials to facilitate Recycling, reuse, transfer, or Transport, including but not limited to, systems employing physical, thermal, organic and/or chemical techniques.

(ll) "Recovered Materials" means metal, paper, glass, plastic, textile, or rubber materials that have known Recycling potential, can be feasibly recycled, and have been diverted and Source Separated or have been removed from the Solid Waste stream for sale, use, or reuse as raw materials, whether or not the materials require subsequent Processing or separation from each other. This term does not include materials destined for any use that constitutes Disposal. Recovered Materials as described in this definition are not Solid Waste.

(mm) "Recovered Screened Materials" or "RSM" means the fines fraction consisting of soil and other small materials derived from Processing of Construction and Demolition Debris which passes through a final screen size no greater than ¾ of an inch.

(nn) "Recycling" means any process by which Solid Waste, or materials which would otherwise become Solid Waste, are collected, separated, or processed and reused or returned to use in the form of raw materials or products.

(oo) "Resource Recovery" means the process by which materials in Solid Waste retaining useful physical and/or chemical properties are reused or recycled for the same or other purposes.

(pp) "Recyclable Material" means those materials which are capable of being recycled and which would otherwise be processed or disposed of as Solid Waste.

(qq) "Sludge" means the accumulated solids, residues, and precipitates generated as a result of waste treatment or processing, including wastewater treatment, water supply treatment, operation of an air pollution

control facility, or mixed liquids and solids pumped from septic tanks, grease traps, privies, or similar waste Disposal appurtenances.

(rr) "Solid Waste" means Garbage, Trash, Construction and Demolition Debris, Vegetative Waste, sewage sludge, rubbish, refuse, White Goods, or other discarded solid or liquid materials resulting from domestic, industrial, commercial, agricultural, and governmental operations. For purposes of this Rule, this term does not include solid or dissolved material in domestic sewage, storm drainage or other significant pollutants in water resources such as silt, dissolved materials in irrigation return flows, or other water pollutants, or waste tires.

(ss) "Solid Waste Management" means the systematic control of the Generation, Storage, collection, Transport, treatment, Processing, Recycling, recovery and Disposal of Solid Waste, including Source Separated material as defined in this Rule, generated within the County or Waste Generated Outside of but Existing in the County for the purpose of Processing and/or Disposal.

(tt) "Solid Waste Management Facility" means any Solid Waste Recycling Facility, Volume Reduction Facility, Transfer Station, or other Facility, the purpose of which is Resource Recovery, Recycling, Processing, or temporary Storage of Solid Waste or Recovered Materials. This term does not include facilities engaged in Disposal or facilities which use or ship Recovered Materials unless such facilities are also managing Solid Waste.

(uu) "Source Separated" means that the Recovered Materials are separated from Solid Waste at the location where the Recovered Materials and Solid Waste are generated. The term does not require that various types of Recovered Materials be separated from each other, and recognizes de minimis Solid Waste, in accordance with industry standards and practices, may be included in the Recovered Materials. Materials are not considered source separated when two or more types of Recovered Materials are deposited in combination with each other in a commercial collection container located where the materials are generated and when such materials contain more than 10 percent Solid Waste by volume or weight. For purposes of this Rule, the term "various types of Recovered Materials" means metals, paper, glass, plastic, textiles, and rubber.

(vv) "Speculative Accumulation" is the recovery and stockpiling of Solid Waste, or materials removed from Solid Waste, for which no feasible means of Recycling on a timely basis is readily available, or in amounts in excess of the amount that can feasibly be processed by a permitted Facility on a timely basis.

(ww) "Storage" means the containment or holding of Solid Waste or Recyclable

Materials, on a temporary basis, in such a manner as not to constitute Disposal of such Solid Waste or Recyclable Materials.

(xx) "Substantial Modification" shall mean a modification which is reasonably expected to lead to substantially different volumes or types of Solid Wastes processed, the approval of which may require a detailed review by the Authority.

(yy) "Time of Retention" means the amount of time data, reports and records must be retained by the permittee. Time of Retention shall be 12 months unless otherwise specified or a longer Time of Retention is required by law.

(zz) "Trash" means combinations of Yard Trash and Construction and Demolition Debris, but excluding Vegetative Waste as defined in this Rule, along with other debris such as furniture, carpet bedding, paper, cardboard, cloth, glass, street sweepings, plastic, or other like matter.

(aaa) "Transfer Station" means a site the primary purpose of which is to store or hold Solid Waste for Transport to a Processing Facility.

(bbb) "Transport" means the act of movement of Solid Waste or Recyclable Materials to facilitate Processing.

(ccc) "Unpermitted Facility" means a Solid Waste Management Facility operating in Palm Beach County that does not have an Operation Permit issued by the Authority.

(ddd) "Vegetative Waste" means Source-Separated organic Solid Waste that is vegetative in origin, and is generated by commercial, institutional, agricultural or industrial operations that is not considered Yard Trash. This term includes, but is not limited to, waste generated by grocery stores, prisons, restaurants, packing houses, and canning operations, as well as products that have been removed from their packaging, such as out of date juice, vegetables, condiments, and bread. This term also includes packaging that is vegetative in origin such as paper or corn-starch based products.

(eee) "Volume Reduction Facility" means incinerators, pulverizers, compactors, shredding and baling Facilities, Composting Facilities, or other Facilities which accept and process Solid Waste for Recycling.

(fff) "Warning Notice" means a notice sent by the Authority to a permittee identifying deficiencies in the Operation and potential violations of Permit Conditions. The issuance of a warning notice does not constitute a finding of violation of a Permit.

(ggg) "Waste Generated Outside of but Existing in the County" means Solid Waste generated outside of the County and transferred into the County for the purpose for Processing, Recycling, Composting, Resource Recovery, Disposal, or volume reduction. This term does not include Recovered Materials, nor does it include Solid Waste generated outside of the County solely being transported through the County to a destination outside of the County. Waste generated outside of but existing in the County shall be regulated in the same manner as Solid Waste generated in the County.

(hhh) "White Goods" means Solid Waste consisting of inoperative and discarded refrigerators, ranges, water heaters, freezers, or other similar domestic or commercial large appliances.

(iii) "Yard Trash" means Solid Waste resulting from landscaping maintenance, or other sources not directly related to a construction project. For purposes of this Rule, Yard Trash does not include Land Clearing Debris or Vegetative Waste.

3 Conflict of Definitions.

3.1 In case of conflict between definitions contained herein and as they may be stated elsewhere, the definitions stated herein shall prevail, unless otherwise required by Federal or State law. Definitions in other Solid Waste Authority Rules may be used to clarify the meaning of terms used in this Rule and Permits issued pursuant to this Rule, unless use of such definition would defeat the purpose or alter the intended purpose and effect of the provisions of this Rule.

4 Prohibitions.

4.1 Operating, maintaining, expanding, or modifying a Solid Waste Management Facility in the County without the appropriate and currently valid Operation Permit issued by the Authority is prohibited, unless the Solid Waste Management Facility is exempted by this Rule or the Plan. The Authority may issue a Permit only after it receives reasonable assurance that the construction and Operation of the Facility will not cause violation of any of the provisions of the Palm Beach County Solid Waste Act, the Plan, or the Rules promulgated thereunder.

4.2 Operating, maintaining, expanding, or modifying a permitted Facility in a manner that is inconsistent with the terms of the issued Operation Permit is prohibited.

4.2 Operating an Unpermitted Facility is prohibited.

4.3 Speculative Accumulation of Solid Waste or Recyclable Material is prohibited.

4.4 Disposal and/or incineration of Solid Waste is prohibited.

4.5 Operating a Facility in a manner that endangers the health, safety and welfare of the residents of the County or properties located near the Facility is prohibited.

4.6 Composting or Processing of Vegetative Waste generated within the County or Generated Outside of but Existing in the County without a Permit, unless exempt by this Rule, is prohibited.

4.7 Diversion of Solid Waste, Vegetative Waste, or Compost generated in the County or Generated Outside of but Existing in the County from the Authority System to a Facility not designated or permitted by the Authority for Processing, Disposal, Composting, fuel production, or to facilitate any form of physical, chemical, or biological process, is prohibited.

This prohibition does not include the beneficial use of Recyclable Material recovered from Solid Waste by a permittee pursuant to the permitted activities performed under a valid Operation Permit and used in a manner that does not constitute Disposal. This prohibition also does not include: (1) the beneficial use of mulch produced from Yard Waste by a permittee pursuant to the permitted activities performed under a valid Operation Permit, including application to the land as a soil amendment in accordance with applicable Best Management Practices; (2) the beneficial use of Yard Waste mulch or wood chips for fuel production, but not incineration; or (3) the beneficial use of Yard Waste mulch or wood chips to facilitate any form of physical, chemical, or biological process intended to produce a salable commodity.

4.8 Permitting of a Solid Waste Management Facility that in the determination of the Board, receives waste solely, predominantly, or in such an amount from outside of the County that it does not significantly serve the interests of the residents and businesses of the County as stated in Section 1.6, is prohibited.

4.9 Permitting of a Competing Disposal Facility.

5 Exemptions.

5.1 The following Solid Waste Management Facilities or activities are exempted from the Permit requirements of the Rule. These exemptions do not relieve any Facility from any other requirements of the Palm Beach County Solid Waste Act, the Plan or Rules of the Authority.

(a) Facilities owned and/or operated by the Authority pursuant to its responsibilities under the Palm Beach County Solid Waste Act and the Plan.

(b) Other governmentally operated transfer or Disposal facilities as identified in the Plan by the Authority.

(c) Structural changes which will not modify the quality, nature, or quantity of an existing and permitted Solid Waste Management Facility and which will not cause Pollution, a public or private nuisance as defined by Florida law, or otherwise negatively impact the health, safety and welfare of residents of the County.

(d) Processing, Storage, or Transport of Solid Waste or Recovered Materials, generated by any household or type of household or by the occupants of that household.

(e) The management, Processing or Disposal of Agricultural Waste generated on a farm by Normal Farming Operations as defined by this Rule and consistent with any applicable Best Management Practices. This exemption does not apply to Solid Waste brought from offsite to a farm, the Processing or Disposal of which would require a Permit.

(f). Backyard Composting as defined in this Rule.

6 Procedure to Obtain Permit; Application; and Fees.

6.1 Any Person desiring to obtain a Permit from the Authority shall apply on forms prescribed by the Authority and shall submit a completed application and any additional information as the Authority may require to fully review and consider an application.

6.2 Any fees for activities identified in this Rule shall be established by the Governing Board of the Authority as part of its annual budget.

6.3 To be considered by the Authority, each application must be accompanied by the proper Application Fee, except for applications filed by state agencies created pursuant to Chapter 20, F.S., and water management districts created pursuant to Chapter 373, F.S. The Application Fee shall be paid by check or any other method of payment acceptable to the Authority and made payable to the: Solid Waste Authority of Palm Beach County. The Application Fee is non-refundable except as provided in this section.

6.4 When an application is received without the required Application Fee, the Authority shall notify the applicant and either return the unprocessed application or arrange with the applicant for the pickup of the application.

6.5 Upon receipt of the proper Application Fee, the Permit processing time requirements stated in this Rule shall begin.

6.6 Any Substantial Modification to a completed application shall restart the time requirements of Section 7.

6.7 A Substantial Modification application requires an additional Application Fee.

6.8 A permittee may request a Substantial Modification of an existing Permit by applying to the Authority.

6.9 An annual Permit Fee shall be required for all Authority permitted Facilities. This fee shall be paid to the Solid Waste Authority of Palm Beach County prior to January 1 of each calendar year. If payment is not received within thirty (30) calendar days of this deadline, the Authority may suspend or revoke the Permit.

7 Permit Processing.

7.1 Within 30 days after receipt of a full and complete application for a Permit and the Application Fee, the Authority shall review the application and shall request submittal of additional information required by this Rule or any other rules or regulations.

7.2 Within 30 days after receipt of such additional information, the Authority shall review it and may request only that information needed to clarify the additional information provided to the Authority or to answer new questions raised by, or directly related to such additional information provided by the applicant.

7.3 If the applicant believes the request of the Authority for such additional information is not authorized by law or rule, the Authority, at the applicant's request, shall begin to process the Permit application. Such a request by the applicant shall be in writing and shall be clearly labeled as a request for the Authority to process the application. The applicant’s request shall state the reasons why the applicant believes the Authority’s request for additional information is not authorized by law or rule. The applicant shall clearly state that the applicant requests the Authority to process the application without that information.

7.4 Permits shall be presented to the Governing Board of the Authority to be approved or denied within 120 days after receipt of the original application, the last item of timely requested additional material, or the applicant's written request to begin processing the Permit application, whichever occurs last.

8 Consultation.

8.1 The applicant is encouraged to consult with Authority personnel before submitting an application, or at any other time concerning the Operation or Substantial Modification of any Solid Waste Management Facility. However, any representation by the Authority shall not relieve any Person from any requirement of Florida law, rules or regulations, Authority Rules, or any applicable Federal, State or local regulations.

9 Standards for Issuing or Denying Permits; Issuance; Denial.

9.1 A Permit shall be issued to the applicant upon such conditions as the Authority may direct, only if the Applicant affirmatively provides the Authority with reasonable assurance based on plans, data, or other information, that the construction, Substantial Modification, Operation, emergency response capability or activity of the Facility will not cause Pollution, create a public or private nuisance as defined by Florida law, contravene the Act, the Plan, this Rule, Authority Resolutions or Rules, or other applicable Federal, State or local regulations.

9.2 Irresponsible Applicant. When determining whether the Applicant has provided reasonable assurances that Authority standards will be met, the Authority shall consider any unresolved past violation(s) of applicable Federal, State or local statutes, rules, orders, or Permit Conditions caused by the Applicant relating to the Operation of any Solid Waste Management Facility in the State. If the Authority finds any unresolved past violation(s), the Authority may deem the Applicant to be irresponsible. An irresponsible applicant may be denied a Permit by the Governing Board. For purposes of this subsection, the following words have the following meaning:

(a) "Applicant" means the owner or operator of the Solid Waste Management Facility in this state, and includes a business entity, a parent of a subsidiary corporation, a partner, corporate officer or director, or a stockholder holding more than 50 percent of the corporate stock.

(b) "Irresponsible" means that an Applicant owned or operated a Solid Waste Management Facility in this state, including transportation equipment or mobile Processing equipment used by or on behalf of the Applicant, which was subject to any unresolved local, state or federal Notice(s) of Violation, judicial action(s), or criminal prosecution(s) for activities that constitute violations of Federal, State or local rules or regulations, Chapter 403, F.S., or the rules promulgated thereunder.

9.3 A Permit shall be issued by the Authority only if the Applicant affirms that the proposed Facility has received the appropriate construction and operation permits, approvals, or proof of exemption from the agencies having jurisdiction.

9.4 If the property that is the subject of the Permit application is owned by another Person, the permittee shall demonstrate through a lease or other form of written agreement that the property owner consents to the permittee's use of the property. The permittee shall promptly notify the Authority in the event of any change in the authorization to use the property.

9.5 If, after review of the application and all additional information, the Authority determines that the Applicant has not provided reasonable assurance that the construction, Substantial Modification, or Operation of the Facility will be in accord with applicable laws, plans or rules, the Authority shall deny the Permit.

9.6 The Authority may issue any Permit with specific conditions necessary to provide reasonable assurance that Authority Rules or applicable law or rules can be met.

9.7 No Authority Permits shall be issued for a term of more than five (5) years unless otherwise specified by statute, rule, or order of the Authority.

9.8 No Permit shall be issued for a Facility subject to any unresolved Notice(s) of Violations or judicial action(s) issued by or initiated by agencies with jurisdiction over the Facility. Upon resolution of any enforcement action by agreement, permit, final order, or judicial action, a Permit may be granted subject to the applicable requirements of Authority Rules. This prohibition shall only be applicable when the enforcement action involves the same activity as the activity for which a Permit is being sought. The Authority shall take into consideration a Permit Applicant's violation of any applicable statutes, rules, orders, or other requirement of any Federal, State, or local agency having jurisdiction over the Operation at any Facility when determining whether the Applicant has provided reasonable assurances that Authority standards will be met.

9.9 The Applicant shall be promptly notified if the Authority intends to deny the application, and shall be informed of the reasons for the intended denial, and of the right to request a hearing before the Governing Board of the Authority.

9.10 The issuance of a Permit does not relieve any Person from complying with the requirements of Chapter 403, F.S., or any other requirements of a Federal, State or local agency with jurisdiction over the Operation of the Facility.

9.11 No Person is entitled to a Permit. The issuance or denial of a Permit is at the sole discretion of the Authority and shall be based on the totality of the information, including but not limited to the information provided by the Applicant, the consistency with the Plan, the impact on the Authority and its operations, and the impact on the surrounding community.

10 Renewals and Extensions.

10.1 The Authority shall endeavor to notify the permittee 125 days prior to the expiration date of a Permit. Failure to receive this notification shall not absolve the permittee of the requirement to submit a timely renewal application for Permit renewal.

10.2 Prior to 120 days before the expiration of a Permit, the permittee shall apply for a renewal. If the renewal application is submitted prior to 120 days before the expiration of the Permit, it will be considered timely. When the renewal application is timely, the existing Permit shall remain in effect until the renewal application has been finally acted upon.

10.3 If the renewal application is submitted 120 days or less from the expiration date, it shall not be considered timely and the Permit may be subject to expiration and a new Application Fee may be required.

10.4 Permits may be renewed after administrative review of Facility compliance status by the Executive Director.

10.5 Permit renewals shall not require an additional Application Fee unless it also includes a request for Substantial Modification.

10.6 If a Permit is not renewed or transferred, the Facility shall be closed in accordance with Section 15 of this Rule.

11 Suspension, Surrender and Revocation.

11.1 In the event a permitted Facility is observed through site inspection to be creating a public or private nuisance as defined by Florida law or is endangering the health, safety or welfare of the residents or surrounding properties, the Executive Director of the Authority shall be authorized to temporarily suspend the Permit, in whole or in part, until the nuisance is abated or the next scheduled meeting of the Governing Board of the Authority, whichever is sooner.

11.2 Permits shall be effective until suspended by the Executive Director, or revoked by the Governing Board of the Authority, surrendered by the permittee, or expired, and shall be subject to the provisions of the Palm Beach County Solid Waste Act, the Plan, Authority Rules, or other applicable law.

11.3 Failure to comply with applicable Federal, State or local Pollution control laws, rules, or permits, shall be grounds for suspension or revocation of the Permit.

11.4 Failure to have a property owner's written consent to operate a Facility shall be grounds for an enforcement action, including the suspension or revocation of the Permit.

11.5 A Permit issued pursuant to this Rule shall not become a vested property right in the permittee. The Governing Board of the Authority may revoke any Permit if it finds that the Permit holder or agent:

(a) Submitted false or inaccurate information in the application or operational reports; or

(b) Has an adjudicated finding that the permittee has violated law, Department or Health Department orders, rules or Permit Conditions, or any requirements of Federal, State or local agencies regulating the construction or Operation of the Facility; or

(c) Has failed to submit monthly operational reports or other information required by Authority Rules; or

(d) Has failed to comply with the terms and conditions of a Consent Agreement executed pursuant to a Warning Notice or a Notice of Violation; or

(e) Has refused lawful inspection; or

(f) Has failed to remit the Permit Fee.

11.6 No revocation shall become effective except after notice is served by personal service or certified mail, upon the Person or Persons named therein, and a hearing held if requested, within the time specified in the notice. The notice shall specify the provision of the law or rule alleged to be violated, or the Permit Condition or Department or Health Department order alleged to be violated, and the facts alleged to constitute a violation thereof.

11.7 A revocation hearing shall be conducted as a quasi-judicial proceeding conducted by and under the Rules of the Governing Board of the Authority, objectively determining the facts and drawing conclusions from them so as to provide the basis of an official action.

11.8 If a Permit is surrendered or revoked, the Facility shall be closed in accordance with Section 15 of this Rule.

12 Enforcement.

12.1 The Executive Director may issue a Warning Notice to a permittee when:

(a) Deficiencies are identified in the Operation of a Facility; or

(b) Potential violations of Permit Conditions are observed; or

(c) Potential nuisances are observed during lawful inspections of the Facility; or

(d) Deficiencies are identified in the required operational records of a Facility; or

(e) A Facility is being operated in a manner that endangers the health, safety or welfare of the residents or surrounding properties.

12.2 The Executive Director and the permittee may resolve matters identified in a Warning Notice by means of a Consent Agreement. Failure to resolve matters via Consent Agreement shall be grounds for issuance of a Notice of Violation.

12.3 The Executive Director may issue a Notice of Violation when:

(a) An activity prohibited by Section 4 of this Rule is observed; or

(b) Documented evidence indicates a violation of a prohibition stated in this Rule; or

(c) Evidence indicates a violation of Permit Conditions; or

(d) Evidence demonstrates the presence of a public or private nuisance as defined by Florida law; or

(e) Documented evidence indicates violations of any of the standards for issuing Permits as identified in this Rule; or

(f) The terms of a Consent Agreement are not met; or

(g) The Facility is being operated in a manner that endangers the health, safety or welfare of the residents of the surrounding properties.

12.4 The Executive Director and the permittee may resolve matters identified in a Notice of Violation by means of a Consent Agreement. Failure to resolve matters via Consent Agreement shall be grounds for enforcement.

12.5 Enforcement of the provisions of this Rule and the Permits issued hereunder shall be conducted pursuant to this Rule and the Palm Beach County Solid Waste Act. Any Facility in violation of a Permit, Federal, State, or local laws may be referred to the Health Department and the Environmental Control Hearing Board as defined in the Palm Beach County Environmental Control Act and pursuant to the procedures outlined in the Palm Beach County Solid Waste Act, applicable County ordinances, and the Palm Beach County Environmental Control Act.

12.6 The Executive Director is authorized to issue a Notice of Violation with or without first issuing a Warning Notice in situations where clear violations are evident from the circumstances.

12.7 All of the forgoing are subject to the suspension, surrender and revocation provisions of Section 11 of this Rule.

13 Transfer of Permits.

13.1 A Permit is issued in the name of a Person as defined in this Rule. Upon sale, legal transfer of a permitted Facility, or change in ownership structure, the new owner or transferee must apply by letter for a transfer of Permit within thirty (30) days. Unless the transferor notifies the Authority of the transfer and to whom transferred, the transferor will remain liable for performances in accordance with the Permit until the transferee applies for a transfer of Permit. Transfer of Permits or change in ownership structure shall not become final until approved by the Executive Director or Governing Board of the Authority. The transferee shall be subject to the Permit Conditions in the existing Permit absent a Substantial Modification.

13.2 Once transferred, the Permit will remain in effect until the original expiration date unless suspended, revoked, or surrendered as set forth in this Rule. A Permit may not be transferred to a new operational location. Relocation of an existing Facility shall require the permittee to apply for a new Permit.

13.3 An application for a Permit transfer shall require an Application Fee as defined in Section 2 of this Rule.

14 Facility Operations – Problems or Deficiencies.

14.1 If the permittee is temporarily unable to comply with any of the conditions of the Permit due to breakdown of equipment or destruction by hazard of fire, wind, or other cause, the permittee shall immediately notify the Authority. Notification shall include pertinent information as to the cause of the problem, and what steps are being taken to correct the problem and to prevent its recurrence, and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any

liability for failure to comply with Authority Rules, or any other applicable Federal, State or local regulations.

14.2 Failure to provide the required notice to the Authority under this Rule may result in the suspension or revocation of the permit.

15 Closure Requirements.

15.1 The permittee shall notify the Authority in writing sixty (60) days prior to ceasing Operations, shall specify a closing date, and will provide the Authority with a Closure plan, as in Section 15.3 or 15.4, as applicable.

15.2 No waste shall be received by the Facility after the closing date specified in the notice required by 15.1 above.

15.3 Closure of a permitted Construction and Demolition Debris Facility shall be in accordance with the requirements of a Department-approved Closure plan.

15.4 The Closure plan for a permitted Yard Trash Facility shall at a minimum address the timeframe for Processing, removal, and Disposal of unprocessed and processed materials, in accordance with applicable Federal, State, or local laws or regulations.

15.5 All materials of any type whatsoever remaining on the site shall be processed, removed, recycled, or disposed from the site in accordance with the Closure plan.

16 General Permit Conditions.

16.1 The following general conditions are hereby incorporated into all Permits issued by the Authority:

(a) The terms, conditions, requirements, limitations and restrictions set forth in this Permit are “Permit Conditions” and are binding and enforceable pursuant to Palm Beach County Solid Waste Act.

(b) This Permit is valid only for the specific processes and Operations applied for and specified in the Permit application and any approved drawings or exhibits, specifications or conditions submitted with or incorporated by reference into the application or Permit. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this Permit shall constitute grounds for enforcement action by the Authority.

(c) The issuance of this Permit does not convey any vested rights or any exclusive privileges. Neither does it authorize or condone any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations. This Permit is not a waiver of or approval of any other permit that may be required for other aspects of the total project which are not addressed in this Permit.

(d) This Permit conveys no title to land or water, nor does it constitute recognition or acknowledgment of title.

(e) This Permit does not relieve the permittee from liability for harm or injury to human health, safety or welfare, animal, or plant life, or property caused by the construction or Operation of this permitted Facility, or from penalties therefor; nor does it allow the permittee to cause Pollution in contravention of Federal, State, or local laws or regulations.

(f) The permittee shall properly operate and maintain the Facility and systems that are installed and used by the permittee to achieve compliance with the conditions of this Permit, or other permits required by Federal, State, or local laws or regulations. This provision includes the Operation of backup or auxiliary Facilities or similar systems when necessary to achieve compliance with the conditions of the Permit and when required by Federal, State, or local laws or regulations.

(g) The permittee, by accepting this Permit, specifically agrees to allow authorized Authority personnel, upon presentation of credentials or other documents and at reasonable times, access to the premises where the permitted activity is located or conducted to:

1. Have access to and copy any records that must be kept under conditions of the Permit;

2. Inspect the Facility, equipment, practices, or Operations regulated or required under this Permit; and

3. Sample or monitor any substances at any location reasonably necessary to assure compliance with this Permit or Authority Rules.

4. Reasonable time and reasonable prior notice shall depend on the nature of the concern being investigated.

(h) If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this Permit due to uncontrollable circumstances, the permittee shall immediately provide the Authority with the following information in writing:

1. A description of and cause of noncompliance; and

2. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and the steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Authority, the Health Department or by the Department or any Federal, State or local agency having jurisdiction over the Operation for penalties or for revocation of this Permit.

3. Notice to the Authority does not relieve the permittee of requirements to provide notice required under any other rule, permit or approval of Federal, State or local agencies having jurisdiction.

(i) The permittee shall notify the Authority of the pendency of an enforcement action of any type by another regulatory agency.

(j) In accepting this Permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or Operation of this permitted Facility which are submitted to the Authority may be used by the Authority as evidence in any enforcement case involving the permitted Facility arising under the Florida Statutes or Authority Rules. Such evidence shall be used to the extent it is consistent with the rules established in the procedures for conduct of quasi-judicial proceedings as adopted by the Governing Board of the Authority.

(k) The permittee agrees to comply with changes in Authority Rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Authority Rules to challenge the appropriateness or validity of such changed Rules or statutes.

(l) This Permit is transferable only upon Authority approval in accordance with Authority Rules. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Authority.

(m) This Permit or a copy thereof shall be kept at the work site of the permitted activity.

(n) Upon request, the permittee shall furnish all records and plans required under Authority Rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Authority.

(o) When requested by the Authority, the permittee shall within a reasonable time furnish any information required by this Rule which is needed to determine compliance with the Permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the Permit application, or in any report to the Authority, such facts or information shall be corrected promptly.

(p) When a Permit is expired, surrendered, or revoked, the permittee shall properly close the permitted Facility in accordance with the Closure Requirements of Authority Rule I Section 15.

(ADOPTED 5/15/91)
(AMENDED 8/18/99)
(AMENDED 2/13/02)
(AMENDED 4/12/17)
(AMENDED 2/8/23)

Appendix N

Sarasota County, Florida, C&D Recycling Ordinance

FLORIDA DEPARTMENT of STATE

RON DESANTIS
Governor

CORD BYRD
Secretary of State

November 22, 2022

Honorable Karen E. Rushing
Clerk of the Circuit Court
Board Records Department
Sarasota County
1660 Ringling Boulevard, Suite 210
Sarasota, Florida 34236

Attention: Maria Bocci

Dear Honorable Karen Rushing,

Pursuant to the provisions of Section 125.66, Florida Statutes, this will acknowledge receipt of your electronic copy of the Sarasota County Ordinance No. 2022-069, which was filed in this office on November 17, 2022.

Sincerely,

Anya Owens
Program Administrator

ACO/rra

R. A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399-0250
Telephone: (850) 245-6270

FILED FOR THE RECORD
2022 NOV 16 PM 5:36
KAREN E. RUSHING
CLERK OF THE CIRCUIT COURT
SARASOTA COUNTY, FL

ORDINANCE NO. 2022-069

AN ORDINANCE OF SARASOTA COUNTY, FLORIDA RELATING TO THE REGULATION OF SOLID WASTE, CODIFIED AS CHAPTER 106, ARTICLE I AND II OF THE CODE OF ORDINANCES OF SARASOTA COUNTY, FLORIDA; AMENDING SECTION 106-1; AMENDING SECTION 106-31; AMENDING SECTION 106-32; AMENDING SECTION 106-33; AMENDING SECTION 106-34; AMENDING SECTION 106-35; AMENDING SECTION 106-36; AMENDING SECTION 106-37; AMENDING SECTION 106-38; AMENDING SECTION 106-39; AMENDING SECTION 106-40; AMENDING SECTION 106-41; AMENDING SECTION 106-42; AMENDING SECTION 106-43; AMENDING SECTION 106-44; AMENDING SECTION 106-45; AMENDING SECTION 106-46; AMENDING SECTION 106-47; AMENDING SECTION 106-48; AMENDING SECTION 106-49; AMENDING SECTION 106-50; AMENDING SECTION 106-52; AMENDING SECTION 106-53; AMENDING SECTION 106-54; AMENDING SECTION 106-55; AMENDING SECTION 106-56; AMENDING SECTION 106-57; AMENDING SECTION 106-58; AMENDING SECTION 106-59; AMENDING SECTION 106-60; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE.

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF SARASOTA COUNTY, FLORIDA;

SECTION 1. This Ordinance shall amend Article I and II, Chapter 106 of the Code of Ordinances of Sarasota County, Florida (the "Code"). In this Ordinance, new text is indicated by underlining and deleted text by ~~strikethrough~~.

SECTION 2. Section 106-1 of the Code is hereby amended to read as follows:

Sec. 106-1. –

(a) *Prohibiting throwing of trash, etc.* No person, firm, company, ~~or~~ corporation or association shall discharge, throw, place or allow to remain in or upon any private premises, road, street, alley, canal, ditch, stream, lake, pond or public road, street, alley, canal, ditch, stream, lake, pond, bay or other waters, or any other public property, except sanitary landfills ~~and septage treatment facilities~~ duly designated and established by the Board of County Commissioners of Sarasota County, Florida, any filth, offal, garbage, ~~foul water, dye water,~~ refuse from industries or manufactories, ~~untreated or improperly treated effluent, raw sewerage, human urine, human excrement,~~ decayed animal or vegetable matter, ~~septic tank effluent, any matter extracted from septic tanks,~~ or any other offensive substances.

(b) *Establishment of sanitary landfills ~~and septage treatment facilities~~.* The Board of County Commissioners of Sarasota County, Florida, is herewith authorized and empowered to designate

Ord 2022-069

and establish sanitary landfills ~~and septage treatment facilities~~ for the deposit of the matters set forth in subsection (a) of this section, and to require the use of the facilities of any municipality within Sarasota County, Florida, when the municipality's facility is to be used as agreed thereto, and to provide reasonable rules and regulations for the depositing of the same in sanitary landfills so established and municipal facilities which have been made available for use hereunder, including, but not limited to, the authority to designate the place in each such sanitary landfill or municipal facility for the deposit of any or all of the materials herein named, and the authority to change the same from time to time.

(1) *Rules and regulations.* The Board of County Commissioners after the conduct of a public hearing is hereby authorized to adopt by resolution rules and regulations governing the operation and control of County sanitary landfills ~~and septage treatment facilities~~.

(2) *Fees and charges.* The Board of County Commissioners is hereby authorized to adopt by resolution, after a public hearing, reasonable fees and charges for the use of any sanitary landfill ~~septage treatment~~ facility constructed, operated or maintained by Sarasota County. Unless specifically exempted by the Board of County Commissioners, all fees and charges shall be paid by all persons prior to their use of ~~septage treatment~~ sanitary landfill facilities.

(c) *Authorization to enforce provisions of section.* The Board of County Commissioners of Sarasota County, Florida, is hereby authorized and empowered to enforce the provisions of this section by injunction or any other appropriate judicial writ or proceeding notwithstanding the fact that a violation of any of the provisions herein shall constitute a misdemeanor.

(d) *Violation of section deemed misdemeanor.* It shall be unlawful for any person, firm, company, corporation or association to discharge, throw, place or allow to remain on the property, premises or waters described in subsection (a) of this section in Sarasota County, Florida, outside the limits of any incorporated municipality, any of the materials described in subsection (a) of this section, and the violation hereof shall be a misdemeanor and upon conviction thereof shall be punished as provided by law for punishment of a misdemeanor.

(e) *Violation of rules and regulations.* Violation of any of the rules and regulations as authorized by subsection (b)(1) of this section shall be a misdemeanor. Any person who violates same shall upon conviction thereof be fined not more than $500.00 or imprisoned for not more than 60 days, or both, and in addition shall pay all costs and expenses involved in the case.

(f) *Provision for rewards.* The Board of County Commissioners of Sarasota County, Florida, is hereby authorized and empowered to offer and pay rewards for information leading to the arrest of any person violating the provisions of subsection (a) of this section, and leading to the conviction of any person of any crime set forth in subsection (d) of this section. Provided, however, that the amount of any reward payable hereunder shall not be less than $10.00 or greater than 50 percent of any fine imposed by any court, whichever amount may be greater.

(g) *Authorization to expend Solid Waste Management Department ~~monies out of fine and forfeiture fund~~.* The Board of County Commissioners of Sarasota County, Florida, is hereby

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authorized to appropriate and expend monies out of the Solid Waste Management Department ~~fine and forfeiture~~ fund of the County for the purposes provided in subsection (f) of this section, and the appropriation and expenditure of monies for said purposes are hereby declared to be for lawful County purposes.

(h) *Elimination from section of invalid portions.* Any sentence, clause, or subsection of this section which for any reason may be declared invalid shall be thereby eliminated from this section, and the remainder hereof shall remain in full force and effect as if such invalid part had not been incorporated herein.

SECTION 3. Section 106-31 of the Code is hereby amended to read as follows:

Sec. 106-31. - Findings.

(a) The Board of County Commissioners of Sarasota County (the "Board") is authorized pursuant to F.S. § 125.01(1), as may be amended from time to time, Article VIII Section 1 of the Florida Constitution and the Sarasota County Charter to carry on County government ~~Government~~, and to enact regulations to promote the public health, safety, and general welfare of the citizens of Sarasota County; to adopt ordinances and resolutions necessary for the exercise of its powers and to prescribe fines and penalties for the violation of ordinances in accordance with law; and to perform any acts not inconsistent with law, which are in the common interest of the people of the County, and to exercise all powers and privileges not specifically prohibited by law.

(b) ~~F.S.~~ § 125.01(1)(k) and ~~F.S.~~ ch. 403 of the Florida Statutes, as may be amended from time to time, grant the Board the authority to regulate Solid Waste Collection and disposal.

(c) Pursuant to F.S. ch. 403, local governments are authorized to enact ordinances to establish county Recycling programs for the separation, collecting and marketing of Recyclable Materials and to ~~i~~ensure the safe and lawful disposition of such wastes and to meet the goals established by the State of Florida to protect health, safety, and welfare of the citizens of Sarasota County.

(d) Section 4.1, Sarasota County Charter requires the establishment of a Mandatory Recycling Program for all Residential and Commercial Customers of the unincorporated area of Sarasota County.

(e) It is essential to the health, safety and welfare of the County's inhabitants within the densely populated areas that Solid Waste, Program Recyclables, and Yard Trash Collection and disposal and/or Processing be regulated in such a manner that Persons accumulating and generating Solid Waste, Program Recyclables and Yard Trash do so under a County mandatory system to ~~i~~ensure the safe and lawful disposition of such wastes.

(f) The Board has initiated and implemented a comprehensive Mandatory Recycling Program.

(g) The Board finds that in order to enhance the beauty and quality of our environment, conserve and recycle our natural resources, reduce the impacts of Solid Waste on the environment ~~contributing to global warming~~, prevent the spread of disease and the creation of nuisances, protect the public health, safety and welfare, and provide for comprehensive waste reduction programs, it is necessary to regulate the Collection and Processing of Recyclable Materials.

(h) The United States EPA has established that Source Reduction is the preferred method of integrated waste management, followed, in descending order, by Recycling, Composting, combustion and landfilling.

(i) Inefficient and improper methods of handling Recyclable Materials create a hazard to public health, cause pollution of air and water resources, constitute a waste of natural resources, have an adverse effect on land values, and create public nuisances.

(j) Source Reduction is a cost-effective waste management approach that encompasses environmentally-sound products and packaging, consumer education and reuse of products and materials in their original form.

(k) Recycling, including Composting, can reduce the depletion of landfill space, save energy and natural resources, provide useful products, and prove economically beneficial.

(l) Landfilling is a viable component of a waste management system for the management of Nonrecyclable Materials and Solid Waste.

(m) ~~The burying or burning of waste destroys nonrenewable resources and adds to the energy needed to produce new products.~~ Reserved.

(n) State and local governments can substantially affect the development of recycled material markets by instituting preferred recycled content materials procurement policies.

(o) Each and every parcel of ~~improved~~ Residential Real Property, within ~~the~~ a Municipal Service Benefit Unit provided by this Article ~~ordinance~~, which is capable of being occupied, is prima facie evidence that Residential Waste is capable of being produced and accumulated upon such properties, and such property will be, therefore, specially benefited by mandatory Residential Waste Collection Services operated under authority of the County by and through the creation of a Municipal Service Benefit Unit (MSBU).

(p) The production and generation of Commercial Waste by eCommercial Customers varies from one property to another; Commercial Customers cannot be made entirely the subject of Annual Assessments and require a determination of Rates for Commercial Waste Collection and disposal and/or Processing different from that imposed upon Residential Customers, within the MSBU provided by this Article ~~ordinance~~.

(q) The Courts of the State of Florida have determined that levies of Rates for Garbage and Waste Collection and disposal, and Recycling Collection, Processing and marketing, similar to those levied herein by Sarasota eCounty are and can be levied as Annual Assessments.

(r) Sarasota County has determined that the most appropriate method to finance Residential Waste Collection and marketing of Program Recyclables is to levy Annual Assessments against residential units located within an MSBU in unincorporated Sarasota County.

(s) There is a valid distinction regarding cost of service between types of residential properties due to differences in the quantity of Residential Waste generated, typical occupancy levels and methods of Collection. The different classes of Residential Customers are based on these

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distinctions. This basis is not unreasonable or discriminatory. Studies have shown that certain properties generate a higher quantity of Solid Waste, Program Recyclables and Yard Trash, have a higher year-round occupancy level, utilize individual Collection containers (Curbside Containers) and are primarily single-family residences. For purposes of this Article ~~Ordinance~~, these properties are designated Class I Customer. A second group of properties has been shown to generate a lower quantity of Solid Waste, Program Recyclables and Yard Trash, have on the average a lower year-round occupancy level, utilize mechanically serviced containers (Class II Containers and Class II Recycling Containers) as well as individual Collection containers and are primarily multiple-family or higher density residential properties. These properties include, but are not limited to, condominium units, apartment buildings, mobile homes, mobile home parks, and cooperatives and shall be designated Class II Customer.

(t) It is necessary for the Board to establish an MSBU and Solid Waste Service District(s) for Residential Waste and Recyclable Materials Collection in the County for purposes of funding the Collection from Annual Assessments.

(u) Sarasota County has determined that the most appropriate method to finance Solid Waste and Yard Trash Collection for Commercial Customers is by individual contractual agreements between the Commercial Customers and the Franchisee, at not-to-exceed Rates approved by the Board.

(v) The Annual Assessment imposed upon ~~improved~~ Residential Real Property is intended to cover the costs of providing Residential Waste Collection, including disposal and/or Processing costs, department administration, other Solid Waste programs and the Cost of administering the Solid Waste Service District(s).

(w) Emergencies may be declared at the federal, state or local level and natural or manmade disasters may occur in the County which generate Disaster Debris which must be managed to eliminate ~~or lessen~~ an immediate threat to life, public health and safety, or eliminate immediate threats of significant damage to improved public or private property; or ensure economic recovery of the affected community to the benefit of the community-at-large; or mitigate the risk to life and property by removing substantially damaged structures and associated appurtenances as needed to convert property acquired through a FEMA hazard mitigation program to uses compatible with open space, recreation, or wetlands management practices.~~to reduce the threat of additional damage to improved property, and/or to promote the economic recovery of the community at large.~~ Collection services as referenced in Section 106.41(a) may be suspended by the Executive Director until declared emergencies have expired.

(x) Provided Right of Entry/Hold Harmless forms have been executed and remain in full force and effect, unless ~~Unless~~ the requirement for a Right of Entry/Hold Harmless form is not required ~~waived~~ by all federal, state and local agencies~~, provided the requisite forms have been executed and remain in full force and effect~~, Haulers designated by the County for emergency Disaster Debris services ~~clean up~~ are hereby expressly authorized to enter upon Private Roads and into Gated Communities for the purpose of collecting Solid Waste and Disaster Debris therefrom as may be required; however, Haulers shall not enter private property, Dwelling Units ~~dwelling units~~ or other residential buildings.

(y) Collection and disposal of Residential Waste and Commercial Waste within the Solid Waste Service District(s) shall be pursuant to a Franchise Agreement.

(z) The cost of service as among residential properties designated as Class I Customers within the Solid Waste Service District(s) is substantially similar.

(aa) The cost of service as among residential properties designated as Class II Customers within the Solid Waste Service District(s) is substantially similar.

(bb) The reduction of dumping of Solid Wastes, Yard Trash and Program Recyclables in and upon private properties results in a benefit accruing to each parcel of Improved Real Property within the Municipal Service Benefit Unit by providing a clean, safe and healthy environment for the present and prospective occupants of such property and surrounding properties.

(cc) The Board has determined that it is necessary to revise and update existing Garbage Collection and disposal policies, and to develop a comprehensive Solid Waste ~~and Recyclable Materials~~ regulatory ordinance to ensure that Solid Waste, Yard Trash, and Recyclable Materials Collection is conducted in an efficient manner that protects the aesthetic and environmental concerns of the community.

SECTION 4. Section 106-32 of the Code is hereby amended to read as follows:

Sec. 106-32. - Intent.

This ~~Ordinance~~ Article applies to unincorporated Sarasota County. It is the intent and purpose of this Article ~~Ordinance~~:

(a) To regulate the accumulation, storage, collection and disposal of Solid Waste; and

(b) To regulate Solid Waste Disposal Sites in the unincorporated areas of Sarasota County;

(c) To provide mandatory utilization of a Solid Waste Collection and disposal system for Residential and Commercial Customers. Residential Waste and Commercial Waste is to be handled in the unincorporated County by the creation of a Municipal Service Benefit Unit in such areas;

(d) To establish four categories of Recyclable Materials: Program Recyclables; Recyclable Construction and Demolition (C&D) Debris; Yard Trash; and Additional Recyclables, each category as defined herein;

(e) To implement a Mandatory Recycling Program for unincorporated areas of Sarasota County which provides for Residential Customer Collection of Program Recyclables; which mandates and regulates the Recycling of Recyclable Materials from Commercial Customers; which mandates and regulates the Recycling of Construction and Demolition Debris, which mandates and regulates the Recycling of Yard Trash generated by Commercial Lawn Care Services, and encourages the Recycling of Additional Recyclable Materials. The County retains the right and ability to designate any portion of the Waste Stream as a Recyclable Material or as

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an Additional Recyclable Material, including but not limited to such items as food waste, various electronic equipment, carpeting, carpet pad, and drywall;

(f) To support a state established ~~establish and maintain a Sarasota County~~ Source Reduction/Recycling goal in accordance with state requirements ~~of 60 percent by weight~~;

(g) To develop principles and methodologies of sustainable stewardship throughout the County on an ongoing basis; and

(h) To provide for Disaster Debris services ~~clean up~~ within designated Disaster Area(s) during declared emergencies, including on Private Roads and within Gated Communities provided all prerequisites have been met.

SECTION 5. Section 106-33 of the Code is hereby amended to read as follows:

Sec. 106-33. - Title.

This Article ~~Ordinance~~ may be cited as the "Sarasota County Solid Waste and Recyclable Materials Collection Ordinance".

SECTION 6. Section 106-34 of the Code is hereby amended to read as follows:

Sec. 106-34. - Applicability.

The Residential Waste and Commercial Waste Collection provisions of this Article ~~ordinance~~ are applicable solely within unincorporated Sarasota County; other provisions of this Article ~~Ordinance~~ such as Hazardous Waste and Litter are applicable in unincorporated Sarasota County and are permissive in municipalities within Sarasota County.

SECTION 7. Section 106-35 of the Code is hereby amended to read as follows:

Sec. 106-35. - Construction and interpretation.

This Article ~~Ordinance~~ shall be liberally construed in order to effectively carry out the intent and purpose of the Article ~~Ordinance~~. Where any provision of this Article ~~Ordinance~~ refers to or incorporates another provision, statute, rule, regulations or other authority, it refers to the most current version, incorporating any amendments thereto or renumbering thereof.

SECTION 8. Section 106-36 of the Code is hereby amended to read as follows:

Sec. 106-36. - Definitions.

All definitions contained in this section shall be consistent with definitions contained within the Florida Statutes, as amended from time to time. In case of any conflict with definitions contained in Florida Statutes, the statutory definition shall apply. The following definitions shall be applicable to this Article ~~Ordinance~~, all rules promulgated hereunder, and contracts issued hereunder, unless a different meaning is specifically indicated in the text.

Annual Assessment means the Non-Ad Valorem assessment levied upon ~~improved~~ Residential Real Property within the County to provide funding for the Collection and disposal of Solid Waste, the Collection and Processing of Program Recyclables and Yard Trash, and related programs.

~~*Audited Financial Statement* means a collection of the following as they are defined by the American Institute of Certified Public Accountants: accountants' report (opinion), balance sheet, profit/loss statement, changes in financial position/cash flow statement, notes to the financial statement, accountants' report on supplemental information and supplemental information.~~

~~*Authorized Collector* means a Person to whom a temporary exemption has been granted pursuant to this Ordinance for the Collection of his/its own Solid Waste.~~

Automated Collection means the method of Collection that utilizes collection vehicles that are equipped with mechanical systems to lift a Collection Container to empty the contents into a collection vehicle.

Biological Waste is as defined in section 403.703, F.S. ~~means those wastes that cause or have the capability of causing disease or infection and includes, but is not limited to, Biomedical Waste, diseased or dead animals, and other wastes capable of transmitting pathogens to humans or animals. This term does not include human remains that are disposed of by Persons licensed under F.S. ch. 470.~~

Biomedical Waste is as defined in section 403.703, F.S. ~~means any solid or liquid waste which may present a threat of infection to humans, including nonliquid tissue, body parts, blood, blood products, and body fluids from humans and other primates; laboratory and veterinary wastes which contain human disease-causing agents; and discarded sharps. The following are also included:~~

> ~~(1) Used, absorbent materials saturated with blood, blood products, body fluids, or excretions or secretions contaminated with visible blood; and absorbent materials saturated with blood or blood products that have dried.~~
>
> ~~(2) Nonabsorbent, disposable devices that have been contaminated with blood, body fluids, or secretions or excretions visibly contaminated with blood, but have not been treated by an approved method.~~

Board means the Board of County Commissioners of Sarasota County, Florida.

Broker means a Person that will accept a Recyclable Material in the quantities generated by the County to be sold, or ultimately transferred to an End-User.

Bulk Waste means all large household items that do not require extraordinary management, do not fit into a Curbside Container, and are not covered by the definitions for White Goods and E-Waste ~~Computers and Electronic Equipment~~ including, but not limited to, ~~sofas, tables,~~ bathroom fixtures, ~~bedroom and living room~~ furniture, mirrors, glass doors, fence panels, plywood, ~~appliances not considered White Goods~~, ladders, and carpet; ~~These items shall be placed within three feet from a public or private way for Collection~~.

Certificate of Occupancy means a document produced by the County certifying that a newly

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constructed building has been constructed in compliance with County specifications, and is suitable for use.

Class I Customer means single-family, duplex-triplex and quadruplex Dwelling Units; apartments of two to nine Dwelling Units, residential combination (residence plus commercial), and retirement homes that do not have commercial kitchens and contain two to nine Dwelling Units located within the Service District(s).

Class I Landfill as referenced in Chapter § 62-701 F.A.C., means a landfill which receives an average of 20 tons or more of Class I Waste per day.

Class I Waste as defined in Chapter § 62-701, F.A.C., means Solid Waste which is not Hazardous Waste, and which is not prohibited from disposal in a lined landfill under Rule § 62-701.300, F.A.C.

Class II Container means any container including, but not limited to, dumpster, roll-off, or compaction equipment, approved by the County to be used for the Collection of Solid Waste or Yard Trash from any Class II Customer utilizing dumpster, roll-off or compaction Collection Service. ~~Solid Waste and Yard Trash shall not be commingled in the same container.~~

Class II Customer means mobile homes, recreational vehicles, condominiums, cooperatives, apartment buildings with ten or more Dwelling Units, retirement homes with ten or more Dwelling Units where each unit has a separate cooking facility/kitchen, time-share apartments, mobile home parks including lots for mobile homes and recreation vehicles located within the Service District(s).

Class II Recycling Container means any container including but not limited to, dumpster, roll-off, compaction equipment, or rhino box, authorized and approved by the County to be used for the Collection of Program Recyclables from Class II Customers utilizing dumpster, roll-off, rhino box or compaction equipment for said Collection Service. ~~Plastic bags shall not be used in lieu of or within Class II Recycling Containers.~~

~~*Class I Customer* means single-family, duplex-triplex and quadruplex Dwelling Units; apartments two to nine Dwelling Units, residential combination (residence plus commercial), and retirement homes that do not have commercial kitchens and contain two to nine Dwelling Units located within the Service District.~~

~~*Class II Customer* means mobile homes, recreational vehicles, condominiums, cooperatives, apartment buildings with ten or more Dwelling Units, retirement homes with ten or more Dwelling Units and each unit has a separate cooking facility/kitchen, time-share apartments, mobile home parks including lots for mobile homes and recreation vehicles located within the Service District.~~

Clerk means the Clerk of the Circuit Court and County Comptroller of Sarasota County ~~to the Board of County Commissioners or the minutes Clerk assigned to the Solid Waste Service District~~.

Code Enforcement means the County's system of enforcing County codes and ordinances; the Code Enforcement division of the County. ~~means that part of Solid Waste Management that is responsible for enforcement of provisions of this Ordinance~~.

Code Enforcement Officers has the same meaning as the term in Chapter 2, Article VIII of the Sarasota County Code. ~~means certain designated employees of Sarasota County Government and sworn Deputy Sheriff Officers of the Sarasota County Sheriffs Office empowered to inspect any container to ensure compliance with this Ordinance and are empowered to cite violators under this Ordinance.~~

Collection means the process of picking up, transporting and dropping off of Residential Waste, Commercial Waste and Disaster Debris at the Designated Disposal Site or Designated RMPF, or the process of picking up, transporting and dropping off Exempt Materials to an appropriate Disposal Site or Recycling Facility.

Collection Containers means Curbside Containers, Class II Containers, Roll Carts, Commercial Containers, Recycling Bins, Recycling Carts, Class II Recycling Containers, and/or Commercial Recycling Containers.

Collection Services means Residential Collection Service and/or Commercial Collection Service.

Commercial Activity means any activity (for profit and not for profit) which involves the exchange or sale of commodities or services.

Commercial Collection Service means the Collection of Commercial Waste from Commercial Customers using Commercial Containers, Curbside Containers, or Roll Carts, and may include Commercial Customer Recyclable Materials Collection ~~if said service is contracted between the Franchisee and Customer~~.

Commercial Container means any container including, but not limited to, dumpster, roll-off, or compaction equipment, approved by the Executive Director to be used for the Collection of Solid Waste or Yard Trash from any Commercial Customer utilizing dumpster, roll-off or compaction Commercial Collection Service. ~~Solid Waste and Yard Trash and Program Recyclables shall not be commingled in the same container.~~

Commercial Customer means a Person using Commercial Real Property or Industrial Real Property, located within the Service Area(s), primarily for commerce, including but not limited to hotels, motels, freestanding recreational vehicle parks, governmental entities, churches, hospitals, schools and not-for-profit corporations. This classification shall not include commercially zoned property which is used primarily for residential purposes. Vacant lands, not classified as Improved Real Property, shall be deemed ~~commercial Improved~~ Commercial Real Property.

Commercial Lawn Care Service means the business of lawn and garden maintenance for remuneration. This definition includes landscapers.

Commercial Real Property means real property not classified as residential, including property used primarily for commerce including but not limited to hotels, motels, free-standing recreational vehicle parks, governmental entities, churches, hospitals, schools and not-for-profit corporations. This classification shall not include commercially zoned property that is used primarily for residential purposes. Vacant lands, not classified as Improved Real Property, shall be deemed as Commercial Real Property.

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Commercial Recycling Container means any container including but not limited to, dumpster, roll-off, compaction equipment, or rhino box, authorized and approved by the Executive Director to be used for the Collection of Program Recyclables from Commercial Customers utilizing dumpster, roll-off, rhino box or compaction equipment Collection Service. ~~Plastic bags shall not be used in lieu of or within Commercial Containers~~.

Commercial Supplemental Collection Services means services provided by the Franchisee to Commercial Customers which are not included in the Commercial Collection Service Rate, including, but not limited to, extra or special Collection, gate service, roll-out service, unusual Commercial Customer requirements, Customer owned Commercial Container maintenance, container modification, roll-off service, or locking devices.

Commercial Waste means Solid Waste and Yard Trash, as defined herein, generated upon Commercial and Industrial Real Property.

Composting means the controlled biological decomposition of organic Solid Waste, food and paper waste, and Yard Trash carried out under controlled conditions which stabilize the organic fraction of waste into a material which can easily and safely be stored, handled and used in an environmentally acceptable manner for soil, growing medium, or other similar uses. Simple exposure of Solid Waste under uncontrolled conditions resulting in natural decay, public nuisances, or conditions adversely affecting the environment or public is not Composting. Composting activities shall not violate the provisions of other state or local laws, ordinances, rules, regulations, or orders.

~~*Computers and Electronic Equipment* means, but is not limited to, computers, monitors, televisions, cathode ray tubes, printers, scanners, and fax machines. Other equipment may be added to this list upon agreement between the County and the Franchisee.~~

Construction and Demolition (C&D) Debris is as defined in section 403.703, F.S. ~~means materials generally considered to be not water soluble and nonhazardous in nature, including, but not limited to, steel, glass, brick, concrete, asphalt roofing material, pipe, gypsum, wallboard, and untreated lumber, resulting from the construction or destruction of a structure as part of a construction or demolition project or from the renovation of a structure, and including rocks, soils, tree remains, trees, and other vegetative matter which normally results from land clearing or land development operations for a construction project, including such debris from construction of structures at a site remote from the construction or demolition site. De minimis amounts of Solid Waste may be included with C&D Debris.~~

Construction and Demolition (C&D) Debris Hauler means any Person who is a Private Hauler, or Commercial Customer who collects and transports C&D Debris from the site of generation or from a transfer point.

Construction and Demolition (C&D) Debris ~~Recycling~~ Facility means a permitted materials recovery or disposal facility as referenced in § 62-701, F.A.C that accepts dedicated loads of C&D Debris and ensures that such materials are processed, to the extent economically feasible, to remove Recyclable Materials prior to disposal. ~~any facility located in unincorporated Sarasota County that provides evidence that it recycles at least 50 percent by weight of the Recyclable C&D~~

~~Debris delivered to the facility. Such evidence includes, but is not limited to, ongoing recovery activity, stockpiling temporarily for the purpose of shipping, receipts, separation and storage of useable/marketable material.~~

County means the unincorporated areas of Sarasota County, Florida; County government, its officers, agents and employees.

Curbside means placement ~~of Solid Waste, Yard Trash, or Program Recyclables~~ within three feet from the nearest public or private way, ~~of the curb line or paving line of the nearest street~~, or in the case of a drainage ditch, at a point within said dimensions adjacent to the nearest driveway within Customer's own property boundary extended through the right-of-way to the road or agreed upon location by Customer, County and Franchisee.

Curbside Container means ~~1) a metal container with a tight fitting lid, with or without wheels; 2) a durable plastic container with a tight fitting lid, with or without wheels; 3) a plastic bag sufficient in strength for handling by the Franchisee so long as they are closed and unbroken at the time of Collection. Said containers shall be authorized and approved by the Executive Director to be used for the Collection of Solid Waste or Yard Trash from any Class I Customer, or eligible Class II Customer utilizing Curbside Collection Service. Each individual Curbside Container filled with Solid Waste or Yard Trash shall not exceed 40 pounds in weight. Solid Waste and Yard Trash shall not be commingled in the same containers.~~

(1) For Automated Collection – the rolled container(s) provided by the Solid Waste District(s) for Automated Residential Collection. For Commercial Collection, the rolled container provided by either the Customer or Franchisee. Each container shall not exceed the weight limit on cart when filled.

(2) For Manual Collection – a durable metal or plastic container with a tight fitting lid, with or without wheels; or a plastic bag sufficient in strength for handling so long as they are closed and unbroken at the time of collection. Said containers shall be authorized and approved by the Executive Director and shall not exceed 40 pounds in weight when filled.

Customer means any Person defined as a Commercial Customer or as a Residential Customer. Whether or not a Person is a Commercial Customer or a Residential Customer depends upon the context of the section in which the word appears.

Designated Disposal Site means the Central County Solid Waste Disposal Complex (CCSWDC), or other Disposal Site as designated by the County.

Designated Recovered ~~Recyclable~~ Materials Processing Facility (RMPF) means a RMPF ~~facility devoted solely to the storage, Processing, resale, or reuse of Recyclable Recovered Materials~~ which has been selected by the Board to receive, process, and market Program Recyclables, or a transfer station or other site designated by the County to be used as a consolidation point for Program Recyclables, collected by the Franchisee on behalf of the County.

Designated Site(s) means any real property set aside or authorized by the Board for the receipt of Residential Waste, Commercial Waste or Disaster Debris. This term encompasses the terms Designated Disposal Site and Designated RMPF.

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Disaster means any natural, technological, or civil emergency that causes damage of sufficient severity and magnitude to result in a declaration of a state of emergency by the Board, the Governor or the President of the United States.

Disaster Area means the geographical area of unincorporated Sarasota County, as determined by Board resolution, that has suffered extensive property damage as the result of a Disaster, which damage presents an immediate threat to life, ~~the~~ public's health and safety, a threat of additional damage to improved property, and/or impacts the economic recovery of the community. A declared Disaster Area may be less than the entire unincorporated county.

Disaster Debris means scattered items and materials either broken, destroyed or displaced by a Disaster, including, but not limited to, trees and woody debris, construction and demolition materials, personal property and/or mud, silt, gravel and sediment.

Disaster Debris Hauler means any business entity or person designated by the County to collect and transport Disaster Debris.

Disposal Site(s) means any real property set aside or authorized by the Board for a solid waste management facility as defined in Section 403.703, F.S. ~~the receipt of Solid Waste or Disaster Debris, including, but not limited, to Landfill and transfer station(s).~~

Drop-off Charge means the fee charged for the deposit and disposal or Processing of Residential Waste, Commercial Waste or Disaster Debris at the Designated Site(s).

Dual Stream Recycling means the collection of Program Recyclables in two separate Recycling Containers. Container Program Recyclables are not permitted to be mixed with Paper Program Recyclables.

Dwelling Unit means a room or rooms constituting a separate, independent establishment with cooking appliance(s) ~~cooking facilities/kitchen~~, a separate entrance, and bathroom facilities; and physically separated from any other rooms or Dwelling Units which may be in the same structure or in separate structures.

End-User means a Person who reuses Recyclable Materials as a raw material or in the manufacture of a product. This term shall also include a Person who provides for the conversion of Clean Wood Waste to clean-burning fuel for the production of energy for use at facilities other than a waste-to-energy facility as defined in F.S. § 403.70617~~895~~.

Executive Director means the County Administrator or designee.

Extraordinary Wastes means wastes that require extraordinary management, including, but not limited to, abandoned automobiles, boats, tree trunks greater than four feet in length, 16 inches in diameter and 40 pounds in weight, dead animals, agricultural and industrial wastes, Bio-Medical, Biological, Radiological Wastes, and Hazardous Wastes. This term does not include Disaster Debris.

E-Waste means, but is not limited to, computers, printers, scanners, and fax machines of Residential Customers. E-Waste means, but is not limited to, computers, printers, scanners, fax

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machines, monitors, televisions, and cathode ray tubes of Commercial Customers. Equipment may be added to this list by the Solid Waste Management Department.

Fees means amounts billed for services not covered by Rates.

FEMA means the Federal Emergency Management Agency.

Franchise Agreement (Agreement) means the written ~~authority granted by~~ agreement between the Board ~~to a Person~~ and the Franchisee to engage in Collection Services.

Franchisee means the holder of written authority granted by the Board to engage in Collection Services.

Front Yard means the yard area extending from the main entrance of the Premises to the Curbside ~~right of way in front of the property~~.

Garbage means putrescible ~~all kitchen and table food waste, animal or vegetative waste that is attendant with or results from the storage, preparation, cooking or handling of food materials, and is included in the definition of~~ Solid Waste.

Gated Community means a residential community with restricted vehicular access.

Governing Body means the Board.

Hauler means a C&D Debris Hauler, a Franchisee, a Private Hauler, a Commercial Lawn Care Service, a Disaster Debris Hauler or any combination thereof, depending upon the context of the section in which the word appears.

Hazardous Waste is as defined in section 403.703, F.S. ~~refers to Solid Waste, or a combination of Solid Wastes, which because of its quantity, concentration, physical, or chemical characteristics may cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or may pose a substantial present or potential hazard to human health or the environment when improperly transported, disposed of, treated, or otherwise managed and any material or substance identified in the Florida Administrative Code Rule 62-730 and 40 Code of Federal Regulation, Part 261.~~

Holiday means New Year's Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, or any other holiday as approved by the Executive Director.

Improved Real Property means any cleared, graded or drained real property upon which a building or structure has been erected which is occupied or capable of being occupied for Residential, Commercial, or Industrial use; and recreational vehicle park lots contained within parks designated as mobile home parks by the County Department of Health and Human Services.

Industrial Real Property means a place, building or enterprise engaged in the manufacturing or the processing ~~Processing~~ of raw materials or alteration or modification of a product for the purpose of producing a usable or finished product, having commercial waste as a byproduct.

Land Clearing Debris means the uprooted or cleared vegetation resulting from a land clearing operation and does not include Yard Trash.

Landfill means the places specifically designated by the Board and permitted by the state for the disposal of Solid Waste or Sludge.

Landfill Disposal Cost means the sum of the current Landfill Tipping Fee (addressing the cost of Landfill operations) and any Surcharges assessed for new Landfill development or Landfill closure.

Legitimate Complaint means any complaint where the provisions herein, or in the Franchise Agreement, regulating Solid Waste, Program Recyclables, or Yard Trash Collection were adhered to by the Customer and the Franchisee did not perform in accordance with such provisions.

Litter means any Garbage, rubbish, trash, refuse, can, bottle, box, container, paper, tobacco product, tire, appliance, mechanical equipment or part, building or construction material, tool, machinery, wood, motor vehicle or motor vehicle part, vessel, aircraft, farm machinery or equipment, Sludge from a waste treatment facility, water supply treatment plant, or air pollution control facility, or substance in any form resulting from domestic, industrial, commercial, mining, agricultural, or governmental operations.

Load means material, including but not limited to Solid Waste, Program Recyclables, C&D Debris, and Yard Trash, on a vehicle, transported from one point to another.

Mandatory Recycling Program means all aspects of the Collection, transportation, Processing, marketing or other handling or aspect of Program Recyclables, Recyclable Construction and Demolition Debris and Yard Trash, as well as education, technical projects, compliance monitoring, and enforcement as defined by the Solid Waste Management Department.

Manual Collection means the method of Collection that requires the use of manual labor to physically deposit Solid Waste, Recyclable Material, Yard Trash, or any other material as defined herein into a collection vehicle.

Mulch means a protective soil covering spread or left on the ground to help retain moisture longer in the soil by retarding evaporation; to discourage weed growth; to help maintain a constant winter and summer temperature by insulating the soil; or to discourage water runoff and soil erosion by shielding the soil surface from water abrasion and promoting water absorption and retention. The process of making Mulch is called Mulching and is considered a form of Recycling Processing.

Municipal Service Benefit Unit (MSBU) means the mechanism within the Solid Waste Service District(s) for assessing Residential Customer Collection Rates.

Nonconforming Material means any material placed into a ~~Recycling~~ Collection Container not meeting the specifications of the intended material stream for that container ~~included in the definition of Recyclable Materials~~.

Non-Putrescible Waste means Solid Waste not containing organic matter subject to rapid decomposition by fungi and bacteria as to cause obnoxious orders and capable of attracting vectors.

Person means any and all ~~Persons~~ persons, natural or artificial, including any individual, firm or association; any municipal or private corporation organized or existing under the laws of Florida or any other state; any county of the State; and any governmental agency of this State or the Federal Government.

Premises refers to Improved Real Property~~, as defined herein~~.

Prescribed Burning means the controlled application of fire to naturally occurring vegetative matter under specified environmental conditions, and following appropriate precautionary measures, which causes the fire to be confined to a predetermined area and which accomplishes planned land management objectives including fires for wildlife management.

Private Hauler means any business entity or Person engaged in the business of collecting and transporting Commercial Recyclable Materials in the County of Sarasota.

Private Road means a private vehicular access way which is not dedicated to the public and is not publicly maintained.

Processing is as defined in section 403.703, F.S. ~~means any technique designed to change the physical or chemical character or composition of any Recyclable Material so as to render it amendable to recovery, storage or Recycling or safe for disposal, or reduced in volume or concentration. In the case of Yard Trash the term Processing means Mulching and/or Composting.~~

Putrescible Waste means Solid Waste that contains organic matter capable of being decomposed by microorganisms and of such a character and proportion as to cause obnoxious odors and capable of attracting vectors.

Radiological Waste or *Radioactive Waste* refers to any equipment or materials which are radioactive or have radioactive contamination and which are required pursuant to any governing laws, regulations, or licenses to be stored, treated, or disposed of as radioactive waste or radiological waste and means radioactive waste as further defined in F.S. § 404.031(14). Requirements for handling such wastes shall be in accordance with Chapters 64E-4 and 64E-5, FAC ~~Florida Administrative Code~~.

Rates means Board approved amounts to be charged by the Franchisee for Residential Collection Services, for contracted Commercial Collection Services, or for Supplemental Collection Services.

Rear Door Service means any physical location for the placement of Collection Containers on the Residential Customer's property intended for Curbside Collection that is not at the Curbside.

Recovered Material means~~, but is not limited to:~~ metal, paper, glass, plastic, textile, or rubber materials that have known Recycling potential, can be feasibly recycled, and have been diverted and source separated or have been removed from the Waste Stream for sale, use, or reuse as raw materials, whether or not the materials require subsequent Processing or separation from each other, but does not include materials destined for any use that constitutes disposal. Recovered Materials as described above are not Solid Waste. ~~Recyclable Materials may also be Recovered Materials.~~

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Recovered Materials Processing Facility (RMPF) means a facility engaged solely in the storage, Processing, resale, or reuse of Recovered Materials. Such a facility is not a Solid Waste management facility if it meets the conditions of F.S. § 403.7045(1)(e~~f~~).

Recyclable Materials means those materials which are capable of being recycled and that would otherwise be processed or disposed of as Solid Waste. ~~including~~ Includes but is not limited to:

(1) *Additional Recyclable Materials* means materials that ~~should~~ can be recycled, but are not part of the Mandatory Recycling Program, including but not limited to: lead acid batteries, household batteries, Scrap Metals, ~~latex paint,~~ paperboard, carpeting, carpet pad, food waste, drywall and textiles.

(2) *Clean Wood Waste* means C&D Debris from Commercial Customers which is capable of being processed into Mulch, including wood pallets, wood construction materials, (except chromated copper arsenate pressure treated wood) and including Land Clearing Debris such as branches, trees and Yard Trash.

(3) *Recyclable Construction and Demolition (C&D) Debris* means Debris from Commercial Customers which is capable of being economically Recycled, including, but not limited to, wood pallets, wood construction materials, Scrap Metal and concrete, brick, or asphalt which can be effectively processed for Recycling. Recyclable Construction and Demolition Debris shall not include Land Clearing Debris. For purposes of this subsection, C&D Debris shall be considered capable of being economically recycled, if the Processing, shipping and incremental costs associated with the Collection of Recyclable C&D Debris do not exceed the sum of the price a Broker or End-User will pay for the Recyclable C&D Debris.

(4) *Program Recyclables* means Container and Paper Program Recyclables that have been designated by the Board as mandatory Recyclable Materials for Residential and Commercial Customers, including the following:

a. *Container Program Recyclables* means the various container categories defined below:

1. *Aluminum Cans* means used beverage containers.

2. *Aluminum Foil* means aluminum sheets or wrapping, clean of food, commonly used in food preparation or storage whether in sheets or formed (such as food trays) into flexible containers.

3. *Glass* means any food or beverage container constructed of glass of any color.

4. *Plastics ~~Bottles~~* means ~~the following~~ plastic bottles and containers labeled #1 - #7 ~~with a neck,~~ (as coded and labeled on the item by number placed inside a triangle and letters placed below the triangle pursuant to F.S. § 403.708(9))~~, as may be amended from time to time: High Density Polyethylene (coded and labeled HDPE, #2) bottles, and Polyethylene~~

~~Terephthalate (coded and labeled PET, #1) bottles which are any color~~.

5. *Polycoated Paper Carton* means aseptic boxes and gable top containers such as juice boxes, brick packs, milk and juice cartons.

6. *Steel and Tin Cans* means food or beverage containers which consist primarily of ferrous metals, commonly called tin cans and steel jar lids, and empty aerosol containers.

b. *Paper Program Recyclables* means the various paper categories defined below:

1. *Corrugated Cardboard* means cardboard with folded ridges, grooves, or wrinkles placed between flat paper surfaces and commonly used for cartons or boxes. Liners consist of Kraft, jute or test liner. ~~All corrugated cardboard shall be flattened and either cut down to size, no more than two feet by three feet. Staples and tape with water soluble glues do not have to be removed.~~ Wax-coated ~~and oriental corrugated~~ cardboard is ~~are~~ not acceptable.

2. *High Grade and other Mixed* means magazines and catalogs composed of glossy paper, telephone books, white or colored bond paper, book paper, computer paper, cotton fiber content paper, duplicator paper, form bond, manifold business forms, mimeo paper, office paper, printing paper, stationery, writing paper, photocopy or copy machine paper, laser paper, paper envelopes with or without plastic windows, carbonless (NCR) paper, brown Kraft paper, paper grocery bags, tabulating cards, facsimile paper, and manila folders, but excludes paper coated or contaminated with metallics, plastic, wax, carbon, ammonia or nonsoluble glue.

3. *Newspaper* means ~~dry,~~ newsprint including advertising inserts delivered in the newspaper~~, but excluding aged, yellowed, sunburned paper or water saturated paper. Plastic sleeves shall be removed from newspaper before they are placed in the Recycling Container~~.

4. *Paperboard/Boxboard* means a thick paper typically used for packaging products such as soda cans, tissue paper, cereal, and the like.

Recycling means any process~~, including Composting and Mulching, in~~ by which Solid Waste, or materials that ~~which~~ would otherwise be processed or disposed of as ~~become~~ Solid Waste, are collected, separated, or processed and reused or returned to use in the form of raw materials or intermediate or final products. Such raw materials or intermediate or final products include, but are not limited to, crude oil, fuels, and fuel substitutes.

Recycling Bin means 18-gallon red and blue bins stenciled or hot stamped with information authorized and approved by the County for the Collection of Program Recyclables from Class I Customers, and eligible Class II Customers utilizing Curbside Program Recyclables Collection Service. ~~Plastic bags shall not be used in lieu of or within Recycling Bins.~~

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Recycling Cart means a wheeled container, with a capacity up to 100 gallons and an affixed lid, that is authorized and approved by the County for the Collection of Program Recyclables. ~~Plastic bags shall not be used in lieu of or within Recycling Carts.~~

Recycling Container means any container authorized and approved by the County for the Collection of Recyclable Materials, including but not limited to, Recycling Bins, Recycling Carts, dumpsters, and roll-offs. This term encompasses the terms Recycling Bin, Recycling Cart, Class II Recycling Containers and Commercial Recycling Container.

Recycling Facility means any business which recycles materials as defined herein and includes but is not limited to buy back centers, drop-off centers (both permanent and mobile), and Recovered Materials Processing Facilities (RMPF).

Residential Collection Service means the Collection of Residential Waste from Residential Customers.

Residential Customer means a Person who occupies Residential Real Property, including, but not limited to, single-family residences; duplex apartments; apartment buildings; recreational vehicle lots contained within mobile home parks; recreational vehicles; mobile homes; condominium units; cooperatives established pursuant to F.S. ch. 719; time-share apartments; leased residential Premises of the classes described above, whether occupied or not; and Premises occupied as a residence located in or upon commercially zoned real property, provided, however, that where property is used exclusively as a recreational vehicle park, as defined in F.S. § 513.01(10), such property shall be deemed commercial. This term encompasses the terms Class I Customer and Class II Customer.

Residential Real Property means Improved Real Property including, but not limited to, single-family residences; duplex apartments; apartment buildings; recreational vehicle lots contained within mobile home parks (with no separate entrance); recreational vehicles; mobile homes; condominium units; cooperatives established pursuant to F.S. ch. 719; time-share apartments; leased residential Premises of the classes described above, whether occupied or not; and Premises occupied as a residence located in or upon commercially zoned real property, provided, however, that where property is used exclusively as a recreational vehicle park, as defined in F.S. § 513.01 ~~(10)~~, such property shall be deemed commercial.

Residential Supplemental Collection Services refers to services ~~provided by the Franchisee~~ that are not included in the Residential Collection Services covered by Annual Assessment. Such services include, but are not limited to: a second Solid Waste Collection day, Rear Door Service for nonhandicapped Customers; ~~curbside~~ Curbside service more than three feet from a public or private way; in-ground container service; bulk or roll-off container maintenance for Customer-owned containers; service for loose Residential Waste not properly prepared; Class II Container, Class II Recycling Container, or roll-off container service ~~required more than basic service~~ (special Collection) including, but not limited to, rescheduled Collections due to Customer negligence (e.g., said containers are overfilled and cannot be safely dumped). Drop-off Charges associated with Residential Supplemental Collection Services are covered by the Annual Assessment.

Residential Waste means Solid Waste, Yard Trash, Program Recyclables, Bulk Waste, E-Waste,

and White Goods generated upon the Residential Customer's Residential Real Property. Each such material shall be disposed or processed as directed by the County.

Scrap Metal means discarded materials or items which consist primarily of ferrous metals, aluminum, brass, copper, lead, chromium, tin, or nickel.

Service Area means the Solid Waste Service District(s), as delineated in Section 106-39. ~~on Exhibit "A" to Ordinance No. 2019-052, incorporated herein by reference.~~

Service Category means designation of service, i.e. Residential Customer: Class I, Class II, and Residential Supplemental Collection Services; Commercial Customer: Commercial Collection Service and Commercial Supplemental Collection Service.

Set Out means an action, event, or instance comprised of the proper placement of Solid Waste, Program Recyclables, or Yard Trash for Collection at a Customer's Premises, in accordance with ~~County Ordinances~~ this Article.

Single Stream Recycling means the Collection of Program Recyclables in a single Recycling Container. Container Program Recyclables are commingled with Paper Program Recyclables in the same Recycling Container.

Sludge is as defined in section 403.703, F.S. ~~means a Solid Waste pollution control residual which is generated by an industrial or domestic wastewater treatment plant, water supply treatment plant, air pollution control facility, septic tank, grease trap, portable toilet or related operation, or any other such waste having similar characteristics. Sludge may be a solid, liquid, or semisolid waste but does not include the treated effluent from a wastewater treatment plant.~~

Solid Waste is as defined in section 403.703, F.S. ~~means Sludge unregulated under the federal Clean Water Act or Clean Air Act, Sludge from a waste treatment works, water supply treatment plant, or air pollution control facility; or garbage, rubbish, refuse, Special Waste, or other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from domestic, industrial, commercial, mining, agricultural or governmental operations and any additional items which may be defined under F.S. § 403.703(13).~~ This term does not include Disaster Debris.

Solid Waste Management Department means the Sarasota County Solid Waste Management Department or the County entity to which the Executive Director ~~County Administrator~~ assigns the responsibility of administering this Article ~~Ordinance~~.

~~*Solid Waste Management Citizens Advisory Board (SWMCAB)* means the Citizens Advisory Board as defined by County Resolution and as defined in Section 106-39 herein.~~

Solid Waste Service District means the designated Service Areas ~~area~~ for Residential and Commercial Customers as delineated in Section 106-39 ~~on Exhibit "A" to Ordinance No. 2019-052, incorporated herein by reference~~.

Source Reduction means reduction of the quantity or toxicity of Recyclable Materials actually produced or generated. Activities include, but are not limited to, the design and manufacture of products and packaging with minimum volume and toxic content and with longer useful life,

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changing buying and consumption habits at the corporate and household levels and the reuse of products and materials in their original form.

Special Assessment means the Non-Ad Valorem assessment which may be levied upon ~~improved~~ Residential Real Property within the County to provide funding for the Collection and Processing of Disaster Debris and such other services not funded by the Annual Assessment.

Special Waste means Solid Wastes that can require special handling and management, including, but not limited to, White Goods, waste tires, used oil, lead-acid batteries, Construction and Demolition Debris, ash residue, Yard Trash, and Biological Wastes~~, Hazardous Wastes, and Bio Medical Wastes~~.

Supplemental Collection Service means Residential Supplemental Collection Service and Commercial Supplemental Collection Service.

Surcharge means an amount to be established by resolution of the Board for specific purposes related to Solid Waste programs, disposal or handling of special or specific wastes.

Tipping Fee means per ton disposal fee for Landfill and transfer station(s) operations, debt service and closure combined with the Surcharge for Solid Waste at the Landfill or transfer station(s).

Tire means a vehicular tire up to 25" in diameter removed from the vehicle which may be on or off of the wheel rim. This does not include tires from non-motorized vehicles such as bicycles, lawnmowers, or wheelbarrows and does not include non-pneumatic, solid tires.

Unintentional Damage means damage caused to containers by an act unlikely, in normal circumstances, to have resulted in said damage, including but not limited to, wheels of a container fall off or break when the container is handled in the same manner as other containers of that type.

Waste Stream means Solid Waste, Bulk Waste, White Goods, E-Waste ~~Computer and Electronic Equipment~~, Recyclable Materials, Yard Trash, Construction and Demolition Debris, Extraordinary Waste or other discharged solid or semisolid materials, resulting from domestic, residential, commercial, industrial, agricultural, and governmental operations, but does not include Sludge.

White Goods includes air conditioners, heaters, refrigerators, ranges, water heaters, freezers, and other similar domestic and commercial large appliances ~~means inoperative or~~ discarded ~~appliances including but not limited to, refrigerators, ranges, washers, clothes dryers, water heaters, freezers, microwave ovens, air conditioners, or other domestic or commercial size appliances~~.

Yard Trash means vegetative matter resulting from landscaping maintenance and land clearing operations and includes associated rocks and soils~~, including but not limited to, shrub trimmings, tree trimmings, grass clippings, palm fronds and stumps~~. Such items collected by Commercial Lawn Service shall not be considered Yard Trash for the purpose of the Agreement.

Yard Trash Recycling Facility means any facility located within unincorporated Sarasota County that provides evidence that it recycles at least 95 percent of the Yard Trash delivered to the facility. Such evidence includes but is not limited to, ongoing recovery activity, stockpiling temporarily for the purpose of shipping, receipts, separation and storage of useable/marketable material.

SECTION 9. Section 106-37 of the Code is hereby amended to read as follows:

Sec. 106-37. - Recycling goals and responsibilities of solid waste management.

In order to enhance the beauty and quality of our environment, conserve and recycle our natural resources, reduce the impacts of Solid Waste contributing to global warming, develop principles and methodologies of sustainable stewardship, and comply with Federal, State and local Recycling and waste reduction goals and regulations, the Solid Waste Management Department has developed the following goals and responsibilities.

(a) ~~Solid Waste Management shall develop and implement a multifaceted Residential and Commercial Customer Source Reduction education awareness program. Typical efforts may include, but are not limited to, approved Composting methods, minimizing Yard Trash, and environmental shopping activities.~~

~~(b)~~ The Solid Waste Management Department shall work closely with the private sector (Franchisee and Private Haulers, Recycling Facilities, trade associations, etc.) and the general public to develop and implement a multifaceted Residential and Commercial Customer Source Reduction and Recycling ~~Re-cycling Collection, Processing, marketing, and~~ education/awareness program. ~~Typical efforts may include, but are not limited to, research and development on varied issues, conducting feasibility and technical studies, establishing routine compliance procedures/monitoring guidelines, and continuous community based education/promotional programs, including paid media campaigns, procuring promotional Recycling and/or Source Reduction give-away items, and endorsing/supporting the procurement of recycled content items.~~

~~(c) Upon receipt of notification from the Franchisee of businesses that have no visible means of Recycling, Solid Waste Management may develop a process to increase participation of those businesses in Recycling.~~

(bd) The Solid Waste Management Department shall provide education and training to Residential and Commercial Customers in ~~proper~~ Mandatory Recycling Program requirements and facilitate the understanding of the Recycling process.

(ce) The Solid Waste Management Department may develop other programs or initiatives that minimize the generation of Solid Waste~~, such as residential Yard Trash Composting~~.

~~(f) Solid Waste Management in consultation with Class II Customer complex(es) and the Franchisee shall work closely to develop a Recycling Plan customized for each Class II Customer complex as deemed necessary by the Executive Director.~~

~~(1) Solid Waste Management will ensure the Recycling plan addresses methods of Collection within the complex, Recycling Container types, frequency of pick up, and on-site transport equipment necessary to accomplish the required separation and Collection of Program Recyclables, as well as removal of NonConforming Materials and/or Additional Recyclable Materials.~~

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~~(2) The plan may include the designation of a responsible party who may inspect Recycling Containers for NonConforming Materials and Additional Recyclable Materials prior to pick up by the Franchisee.~~

~~(3) The plan may address education of residents on the methods of separation and Collection of Program Recyclables best suited to the particular site as per the requirements of this Ordinance.~~

~~(4) Solid Waste Management will develop multi-lingual brochures when more than 30 percent of seasonal residents are speakers of language other than English. In such cases, the multifamily unit may request that Solid Waste Management provide them with the brochure in the language most commonly spoken.~~

(d~~g~~) The Solid Waste Management Department shall work with Commercial Customers to promote Commercial Recycling, including but not limited to the following:

(1) The Solid Waste Management Department shall regularly conduct business site visits to ensure that Commercial Customers are in compliance with the provisions of this Article ~~Ordinance~~.

(2) The Solid Waste Management Department may conduct business workshops, work with the local chambers of commerce, business organizations, and others to promote business Recycling.

(3) The Solid Waste Management Department may also conduct business recognition programs in cooperation with the private sector, ~~and~~ other local governmental entities, or the state.

(4) The Solid Waste Management Department shall develop Commercial Recycling educational materials and may provide promotional items to be distributed to the Commercial Customers to ~~re-enforce~~ reinforce the goals and provisions of this Article ~~Ordinance~~.

(e~~h~~) Appropriations and expenditures for educational and promotional purposes to implement the purposes of this Article ~~Ordinance~~ are declared to be for lawful public purposes.

(f~~i~~) The Solid Waste Management Department may implement a volunteer program to provide support for Recycling programs and objectives. Volunteers may be recognized annually for their efforts.

(g~~j~~) The Solid Waste Management Department shall promote and educate Customers about the Recycling of Additional Recyclable Materials to help the County meet its Recycling goal.

Section 10. Section 106-38 of the Code is hereby amended to read as follows:

Sec. 106-38. - Providing for a mandatory solid waste service district as a municipal service benefit unit.

Pursuant to the powers granted to the Board by the Florida Constitution and F.S. § 125.01, the Board has authorized the establishment of a Municipal Service Benefit Unit, to be known as the Solid Waste Service District(s) or the Service Area(s), the boundaries of which are described in Section 106-39. ~~Exhibit "A" to Ordinance No. 2019-052 and incorporated herein, replacing in its entirety Exhibit "A" to Ordinance No. 2017-041~~.

(a) Where consistent with the intent of this Article ~~Ordinance~~, and where development or other circumstances require, the boundaries of the Solid Waste Service District(s)~~,~~ may be modified by the Board from time to time. No modification of the boundaries of the Solid Waste Service District(s) may occur until the Board has considered the necessity in a duly advertised public hearing.

(b) The purpose of the Solid Waste Service District(s) is to promote the common interests of the people of the County and to provide the mandatory Collection of Residential Waste and Commercial Waste. The Residential Collection Service will be provided through the levying of Special Assessments as provided for herein, unless exempt from the mandatory provisions of this Article ~~Ordinance~~. Service Rates and Fees will be established through the adoption of a Franchise Agreement. Further, the purpose is to promote the health, welfare, and safety of the citizens and residents of the Solid Waste Service District(s) by providing adequate Collection of Residential Waste and Commercial Waste.

SECTION 11. Section 106-39 of the Code is hereby amended to read as follows:

Sec. 106-39. - ~~Advisory board.~~ Description of Solid Waste Service Districts.

~~The Board may establish by resolution a citizens' advisory committee to provide recommendations to the Board concerning matters related to this article.~~

(a) *Solid Waste Service District through September 30, 2024.* The boundaries of the Solid Waste Service District or the Service Area through September 30, 2024 are described in Exhibit "A" to Ordinance No. 2019-052 and incorporated herein.

(b) *Solid Waste Service Districts from October 1, 2024.* The boundaries of the Solid Waste Service Districts or Service Areas effective October 1, 2024 are described as follows:

(1) North Area Solid Waste Service District:

Those lands lying within Sarasota County, Florida, being more particularly described as follows:

Those portions of Sections 1 and 2, Township 36S Range 17E, less and except the incorporated limits of the City of Sarasota.

Also, all of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 24, 25, 26, 34, 35 and 36, Township 36S, Range 18E.

Also, those portions of Sections 6, 7, 8, 14, 15, 16, 17, 22, 23, 27, 28, 32 and 33, Township 36S, Range 18E, less and except the incorporated limits of the City of Sarasota.

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Also, all of Sections 1-36, inclusive, Township 36S, Range 19E.

Also, all of Sections 1-36, inclusive, Township 36S, Range 20E.

Also, all of Sections 1, 2, 3, 4, 8, 9, 10, 11, 12, 15, 16 and 22, Township 37S, Range 18E.

Also, that portion of Section 5, Township 37S, Range 18E, less and except the incorporated limits of the City of Sarasota.

Also, those portions of Section 17, 20, 21 and 28, Township 37S, Range 18E, lying Northeasterly of US. 41 (Tamiami Trail).

Also, those portions of Sections 23 and 26, Township 37S, Range 18E, lying Westerly of McIntosh Road.

Also, that portion of Section 27, Township 37S, Range 18E, lying Northeasterly of US. 41 (Tamiami Trail) and Westerly of McIntosh Road.

Also, all of Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, Township 37S, Range 19E.

Also, those portions of Sections 15, 16, 17, 18, 22, 23 and 24, Township 37S, Range 19E, lying Northerly of Clark Road (State Road 72).

Also, all of Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 22, 23, 24, 25 and 26, Township 37S, Range 20E.

Also, those portions of Sections 19, 20, 21, 27, 28, 34, 35 and 36, Township 37S, Range 20E, lying Northerly of Clark Road (State Road 72).

(2) *South Area Solid Waste Service District.*

Those lands lying within Sarasota County, Florida, being more particularly described as follows:

That portion of Section 36, Township 36S Range 17E, less and except the incorporated limits of the City of Sarasota.

Also, all of Sections 1, 11, 12 and 13, Township 37S, Range 17E.

Also, that portion of Section 2, Township 37S, Range 17E, less and except the incorporated limits of the City of Sarasota.

Also, all of Sections 7, 13, 14, 18, 19, 24, 25, 29, 32, 33, 34, 35 and 36, Township 37S, Range 18E.

Also, that portion of Section 6, Township 37S, Range 18E, less and except the incorporated limits of the City of Sarasota.

Also, those portions of Sections 17, 20, 21 and 28, Township 37S, Range 18E, lying Southwesterly of US. 41 (Tamiami Trail).

Also, that portion of Section 27, Township 37S, Range 18E, lying Westerly of US. 41 (Tamiami Trail) and Easterly of McIntosh Road.

Also, those portions of Sections 23 and 26, Township 37S, Range 18E, lying Easterly of McIntosh Road.

Also, all of Sections 19, 20, 21, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36, Township 37S, Range 19E.

Also, those portions of Sections 15, 16, 17, 18, 22, 23 and 24, Township 37S, Range 19E, lying Southerly of Clark Road (State Road 72).

Also, all of Sections 29, 30, 31, 32 and 33, Township 37S, Range 20E.

Also, those portions of Sections 19, 20, 21, 27, 28, 34, 35 and 36, Township 37S, Range 20E, lying Southerly of Clark Road (State Road 72).

Also, all of Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 22, 23, 24, 25, 26, 27, 35 and 36 Township 38S, Range 18E.

Also, all of Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 24, 30 and 31 Township 38S, Range 19E.

Also, those portions of Sections 20, 21, 22, 23, 25, 28, 29, 32, 33, 34 and 36, Township 38S Range 19E, less and except the incorporated limits of the City of Venice.

Also, all of Sections 1-36, inclusive, Township 38S, Range 20E.

Also, all of Sections 1-36, inclusive, Township 38S, Range 21E.

Also, all of Sections 1-36, inclusive, Township 38S, Range 22E.

Also, those portions of Sections 1 and 2, Township 39S Range 18E, less and except the incorporated limits of the City of Venice.

Also, all of Sections 1, 2, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 31, 32, 33, 34, 35 and 36, Township 39S, Range 19E.

Also, those portions of Sections 3, 5, 6, 8, 9, 10, 17, 18, 20, 29 and 30, Township 39S Range 19E, less and except the incorporated limits of the City of Venice.

Also, all of Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, and 27, Township 39S, Range 20E.

Also, those portions of Sections 12, 14, 25, 28, 30, 32, 33, 34, 35 and 36, Township 39S, Range 20E, less and except the incorporated limits of the City of North Port.

Also, all of Sections 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 35 and 36 Township 40S, Range 19E.

Also, all of Sections 15, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31 and 32, Township 40S, Range 20E.

Also, those portions of Sections 1, 2, 3, 11, 12, 13 and 33, Township 40S Range 20E, less and except the incorporated limits of the City of North Port.

(c) The purpose of the North Area Solid Waste Service District and South Area Solid Waste Service District is to promote the health, welfare, and safety of the citizens and residents of the Solid Waste Service Districts by providing adequate Collection of Residential Waste and Commercial Waste and providing for the mandatory Collection of said waste. Further, the intent of the Board in creating two separate Solid Waste Service Districts is to promote additional competition and ensure the cost effective, efficient, and responsible collection and disposal of Residential Waste and Commercial Waste within the County. The Residential Collection Service will be provided through the levying of Special Assessments as provided for herein, unless exempt from the mandatory provisions of this Article. Service Rates and Fees will be established through the adoption of a Franchise Agreement or Franchise Agreements for the respective Solid Waste Service Districts.

SECTION 12. Section 106-40 of the Code is hereby amended to read as follows:

Sec. 106-40. - General powers.

The Board shall have all the powers necessary or convenient to carry out the purposes of this Article ~~Ordinance~~ and such additional rights and powers as are provided by the Constitution of the State of Florida and the laws of the State of Florida. The Board shall also have all powers not otherwise prohibited by law, including, but not limited to:

(a) Power to ~~use~~ sue or be sued, complain or defend in the name of the County in any and all courts or administrative agencies;

(b) Power to acquire by grant, purchase, gift, device, exchange, or in any other lawful manner any property, real or personal, or any estate or interest therein upon such terms and conditions as the Board shall determine;

(c) Power to enter into contracts with any qualified private, public, or municipal firm, Person, or corporation for the furnishing of Solid Waste services within the boundaries of the Municipal Service Benefit Unit;

(d) Power to establish by appropriate resolution any Special Assessment or Service Charge.

(e) Power to levy and collect, without referendum, Annual or Special Assessments, Rates or Fees as required for the Collection of Residential Waste, Commercial Waste and Disaster Debris within the County;

(f) Power to adopt rules and regulations governing the MSBU and Solid Waste Service District(s) through appropriate resolutions. The Board may adopt, by appropriate resolution: (i)

the procedures to establish, adjust and approve any Annual or Special Assessment within the County, and any Fee or Surcharge, and (ii) the Fees, Surcharges and Special Assessments;

(g) The Board, through a County approved procurement process, may grant or extend franchise(s) to qualified haulers for the exclusive or nonexclusive Collection of Residential Waste and/or Commercial Waste for a period of time not to exceed 20 years, upon such terms and conditions as the Board may determine to be in the public interest. No Person shall be considered for a franchise to collect and dispose or process said waste in the County unless and until the Board has received satisfactory evidence of the following, and the haulers covenant as follows:

(1) The submittal is made in good faith.

(2) The hauler has the means and resources to carry out the Collection Service required.

(3) The hauler has the ability to maintain insurance in the form and the amount prescribed by the Board, including liability coverage and indemnification of the County.

(4) The hauler has complied with, or demonstrates its capacity and willingness to comply with, all Federal, state and local laws and ordinances, rules and regulations, including required permitting.

(5) The hauler has the ability to give surety for the faithful performance under the Article ~~Ordinance~~.

(h) All submittals initiated by any Person~~, or by the County,~~ shall be executed under oath.

(i) The Executive Director will be responsible for developing the franchise solicitation. The recommendation of franchisees shall be in conformance with the Procurement Code.

(j) Any Person owning any franchise heretofore granted by the Board for the Collection of Residential Waste and Commercial Waste shall become the authorized Person to collect and deliver for disposal or Processing Residential Waste and Commercial Waste in the Solid Waste Service District(s) covered by the existing Franchise Agreement, in the manner, as if originally established and authorized under the provisions of this Article ~~Ordinance~~, for the balance of the term of years heretofore granted, unless sooner amended, modified, or revoked pursuant to law or this Article.

(1) Any modification by the Board of the boundaries of the Solid Waste Service District(s) shall also result in the simultaneous, equivalent modification of the boundaries of the Franchise Agreement area, unless specifically provided otherwise by the Board.

(2) Upon modification of the boundaries of the Solid Waste Service District(s), the Franchisee shall implement the provision of Residential Waste and Commercial Waste Collection Service in the area included in the Solid Waste Service District(s) by the modification.

(k) The Board shall determine the Annual Assessment to be imposed upon each class of Residential Customer within the Solid Waste Service District(s). Annual Assessments must be uniformly assessed within each Customer class within the Solid Waste Service District(s). The

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Board shall annually levy and impose upon all ~~improved~~ Residential Real Property ~~classified as residential property~~ in the sSolid Waste Service District(s), within each Customer Class provided by this Article ~~Ordinance~~, an Annual Assessment to cover the cost of Collection, including disposal and/or Processing costs, of Residential Waste, the administration of the Solid Waste Service District(s) and other Solid Waste programs.

(l) The Board shall determine any Special Assessments to be imposed within the County. Special Assessments shall cover the cost of Collection, including disposal and/or Processing costs of Disaster Debris and such other Collection/disposal and/or Processing services not covered by the Annual Assessment.

(m) Notwithstanding any other provisions of this Article ~~Ordinance~~, the Board may institute any procedure that will facilitate the billing and collection of such Annual or Special Assessments, consistent with laws applicable thereto.

(n) Annual Assessments levied by the Board for the Collection of Residential Waste do not cover the cost of removal and disposal or Processing of the following Waste Stream materials:

(1) Land Clearing Debris.

(2) Construction and Demolition Debris, including any debris resulting from remodeling that requires a building permit, except that for Residential Customers, up to two cubic yards or four 32-gallon containers of C & D Debris can be Set Out Curbside for Collection.

(3) Trash and debris associated with farming operations, when the farming activity involves five acres or more of land.

(4) Hazardous (other than household Hazardous Wastes or Special Wastes delivered to the County Designated Site(s) as part of the Collection Services covered by the Franchise Agreement), Biological, Bio-Medical, and Radiological Waste.

(5) Wrecked, scrapped, ruined or dismantled motor vehicles, or motor vehicle parts, including batteries.

(6) Residential Waste generated on Residential Real property or by Customers located within the unincorporated areas of Sarasota County lying outside the boundaries of the Sarasota County Solid Waste Service District(s) ~~provided by ordinance~~.

(7) Residential Waste generated on Residential Real property or by Customers located within the incorporated areas of Sarasota County.

(8) Sludge.

(9) Commercial Customer Waste Stream materials.

(10) The Collection portion of the Rates for Solid Waste, Program Recyclables or Yard Trash collected as part of Residential Supplemental Collection Services.

(11) Liquid, semisolid, or contained gaseous material resulting from domestic, industrial, commercial, mining, agricultural or governmental operations.

SECTION 13. Section 106-41 of the Code is hereby amended to read as follows:

Sec. 106-41. - Description of service.

All property within the Solid Waste Service District(s) shall be subject to mandatory Residential Waste (including Program Recyclables) and Commercial Waste Collection Services, as provided by this Article ~~Ordinance~~. Except as provided in this section, it shall be the responsibility of the Governing Body to provide within the Solid Waste Service District(s) either directly or indirectly through agreement(s) the following services:

(a) *Residential Collection Services.*

(1) ~~Subject to Section 106-41(c) herein, it~~ It is mandatory that all owners or occupants of ~~improved~~ Residential Real Property within the Solid Waste Service District(s) use the Franchisee for the Collection of ~~Solid Waste, Yard Trash, Bulk Waste, White Goods, and Program Recyclables (collectively known as~~ Residential Waste~~)~~. It is permissible for occupants of ~~improved~~ Residential Real Property to use the Franchisee for the Collection of E-Waste ~~Computers and Electronic Equipment~~, used oil and used oil filters, and Tires ~~tires (including tires with rims)~~ in accordance with the regulations of the Solid Waste Management Department.

(2) The Annual Assessments, for each Customer, Class I and Class II, imposed pursuant to this Article ~~Ordinance~~, shall cover the cost of Collection Services, as determined by the Board from time to time, of all properly bundled and prepared Residential Waste, E-Waste ~~Computers and Electronic Equipment~~, used oil, used oil filters, and Tires ~~tires~~, including disposal costs (but excluding Collection costs) of Residential Supplemental Collection Services, generated from the ~~improved~~ Residential Real Property. The Annual Assessment shall also cover the cost of the administration and ~~processing~~ Processing of Program Recyclables for the Solid Waste Service District(s).

(3) The Franchisee shall not conduct Residential Collection Services prior to 6:00 a.m. or after 8:00 p.m. unless otherwise authorized by the Executive Director.

(4) Class I Collection Service (via Curbside) shall consist of once-per-week Collection of properly prepared Residential Waste.

(5) Class II Collection Service (via dumpsters) shall consist of a minimum of once-per-week Collection of properly prepared Residential Waste.

(6) Residential Collection Services shall be performed by the Franchisee Monday through Friday, except during Holiday weeks or as otherwise authorized by the Executive Director.

(7) Residential Collection Services shall be provided to each Customer on the same day each week by the Franchisee.

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(8) The Franchisee shall ensure the Collection of all Residential Waste, except Extraordinary Waste~~,~~ and Sludge, from or generated by Residential Class I and Class II~~, as defined herein,~~ within the Service Area(s) and shall be governed by the terms and conditions of the contractual agreements between the County ~~Governing Body~~ and the Franchisee.

~~(9) Franchisee and Disaster Debris Haulers are expressly authorized to enter upon Private Roads and into Gated Communities for the purpose of collecting Disaster Debris from Residential Customers at locations consistent with Section 106-47 provided that either (a) Right of Entry/Hold Harmless Agreements have been executed by the owners of property along the respective Private Road(s) or by an authorized representative of the Homeowners' Association of the respective Gated Community(ies) pursuant to Subsection 106-47(di) herein and remain in full force and effect or (b) the County has informed the Franchisee and/or Disaster Debris Haulers that the Federal Emergency Management Agency (FEMA) has waived the requirement for such agreements. Franchisee and Disaster Debris Haulers shall not enter onto private property, into Dwelling Units dwelling units or other residential buildings for the purpose of collecting Residential Waste in a manner inconsistent with this Article.~~

(b) *Collection of Disaster Debris.*

(1) In the event that a State of Emergency is declared by the Board, the Governor of Florida or the President of the United States, consistent with the County's Emergency Management Plan, the Board or designee shall confer with Emergency Services to determine if Disaster Debris present within the County, including Disaster Debris on Private Roads and within Gated Communities, is so widespread that it is in the public interest to remove the debris to protect the public health, safety and welfare, to reduce the threat of additional damage to improved property, and/or to promote economic recovery of the community at large.

(2) If such a determination is made by the Board or designee and the requisite Right of Entry/Hold Harmless agreements have been executed pursuant to Subsection 106-47~~(i)~~ herein and remain in full force and effect, or FEMA has waived the requirement for such forms, Franchisee and/or Disaster Debris Haulers shall collect Disaster Debris within the designated Disaster Area(s) that is placed at the curb of public rights-of-way by residential property owners. On Private Roads and within Gated Communities, Disaster Debris will be collected at the same locations as Residential Waste is collected.

(3) When the Franchisee and/or Disaster Debris Haulers have been directed by the County to collect Disaster Debris, provided that the requisite Right-of-Entry/Hold Harmless forms have been executed and remain in full force and effect or the requirement for such forms has been waived, said collectors are hereby authorized to enter upon Private Roads and into Gated Communities for the purpose of collecting Disaster Debris from Curbside Collection units at locations consistent with Section 106-47 of this aArticle. Haulers shall not otherwise enter onto private property, into Dwelling Units ~~dwelling units~~ or other residential buildings for the purpose of collecting Disaster Debris.

(4) The County shall not reimburse any community or resident that hires a private contractor to remove and dispose of Disaster Debris or to transport Disaster Debris to a public right-of-way.

(5) The County does not provide Disaster Debris collection services for Commercial Real Property. Owners of Commercial Real Property must make their own arrangements for Disaster Debris removal.

(6) To the extent allowed by law, the County will indemnify, hold harmless and defend FEMA from any liability, claims, or loss or damage resulting from the collection of eligible Disaster Debris consistent with this Section. This section does not constitute a waiver of the County's sovereign immunity.

(c) *Commercial Collection Services.*

(1) It is mandatory that all owners and/or occupants of Commercial Real Property within the Solid Waste Service District(s) use the Franchisee for the Collection of Solid Waste and Yard Trash. It is permissible for owners and/or occupants of Commercial Real Property to use the Franchisee for the Collection of Bulk Waste, White Goods, Program Recyclables, E-Waste, used oil and used oil filters, and Tires in accordance with this Article.

(2) ~~Subject to Section 106-41(c) herein~~, Franchisee shall ensure the Collection of Putrescible Solid Waste ~~and Yard Trash (collectively known as Commercial Waste)~~, except Extraordinary Waste~~,~~ and Sludge, from or generated by any commercial or Industrial entity~~, as defined herein,~~ within the Service Area(s) a minimum of once-per-week.

(3) Franchisee shall ensure the Collection of Commercial Waste, excluding Putrescible Solid Waste, Extraordinary Waste, and Sludge, from or generated by any commercial or Industrial entity within the Service Area(s) a minimum of once every two weeks.

(4) Collection of Program Recyclables from or generated by any commercial or Industrial entity within the Service Area(s) shall occur a minimum of once every two weeks.

(52) ~~The Franchisee shall not conduct~~ Commercial Collection Services for ~~to~~ Commercial Customers ~~located within 200 feet of Residential Real Property, prior to~~ shall not be conducted between 8:00 p.m. and 6:00 a.m. ~~or after 8:00 p.m.~~ unless otherwise authorized by the Executive Director.

~~(3) In areas specifically designated by the Executive Director, based on complaints due to noise, the Franchisee shall not conduct Commercial Collection Services to Commercial Customers prior to 7:00 a.m. or after 8:00 p.m.~~

(64) Commercial Collection Services, excluding non-franchise recycling collection, shall be provided to each Customer on the same day each week ~~by the Franchisee~~.

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(de) *Exempt Materials.* Only the following types of Waste Stream materials are exempt from the mandatory provisions of this Article ~~Ordinance~~ and may be collected and delivered for disposal or Processing at the ~~authorized~~ Designated Site(s) by the owner or occupant of any Premises, or the owner's or occupant's representative, at the owner's or occupant's expense. Any such Collection and disposal shall be in accordance with the provisions of this Article, ~~Ordinance~~ and other ordinances of Sarasota County, and all state and federal laws relating to the Collection and disposal of Solid Waste:

(1) Land Clearing Debris.

(2) Construction and Demolition Debris, ~~.~~ including Residential Construction and Demolition Debris, ~~debris including any remodeling, which may or may not require a building permit, in excess of~~ except that Residential C & D Debris up to two cubic yards or four 32-gallon containers can be Set Out Curbside for Collection.

(3) Trash and debris associated with farming operations.

(4) Extraordinary, Hazardous, Bio-Medical, and Radiological Waste, excluding Special Waste included as part of the Collection Services covered by the Franchise Agreement.

(5) Wrecked, scrapped, ruined or dismantled motor vehicles, or motor vehicle parts, including used oil, tires and batteries.

(6) Recyclable Materials. Providing the materials are subjected to a Recycling process.

(7) Residential Waste generated in the unincorporated areas of Sarasota County lying outside the boundaries of the Solid Waste Service District(s) ~~as provided by ordinance~~.

(8) Residential Waste generated on Residential Real ~~p~~Property or by Customers located within the incorporated areas of Sarasota County.

(9) Sludge.

(10) Liquid, semisolid, or contained gaseous material resulting from domestic, industrial, commercial, mining, agricultural, or governmental operations.

(11) Putrescible Waste collected with the intent of Composting from an event meeting the temporary use conformities, conditions, safeguards and stipulations of Appendix A Zoning Regulations Article 5, where such event may or may not require a permit, and that has an attendance of under 1000 attendees over the full duration of the temporary use.

Section 14. Section 106-42 of the Code is hereby amended to read as follows:

Sec. 106-42. - Annual assessment.

(a) It shall be the responsibility of the property owners of a Dwelling Unit to pay or cause to be paid to the County an Annual Assessment incurred by the Dwelling Unit(s) for the benefits

received by such dwelling. Failure to pay this charge shall be considered a violation of this Article ~~Ordinance~~ and the charges may be collected as provided herein or as otherwise provided by the laws of the State of Florida.

(b) The Ceounty or its designated agent will be responsible for the billing and collection of payments in the Solid Waste Service District(s) through the levy of Annual Assessments, as set forth herein.

(c) The fiscal year of the Solid Waste Service District(s) shall commence on October 1 of each year and end on September 30. The County budget officer shall present to the ~~Governing Body~~ Board an annual budget for the Solid Waste Service District(s) ~~as prepared by Solid Waste Management~~.

(d) Annual Assessments shall be levied, collected and distributed pursuant to state law. The assessment shall constitute a lien as of October 1 of each year in which an Annual Assessment is levied. All costs of the Tax Collector and Property Appraiser shall be deemed costs of administration of the Solid Waste Service District(s).

(e) The Board shall provide procedures for the levy and collection of the Annual Assessments for new construction upon ~~residential Improved~~ Residential Real Property, for changes in use of assessed property, and for errors or omissions from the assessment roll. In the absence of procedures established by the Board, the procedures used by the Sarasota County Tax Collector may be used.

(f) Fee time share real property shall be classified as residential, with each separate accommodation as defined by Florida Statutes~~,~~ therein deemed a separate Residential Customer. Each single-family apartment, regardless of the number of time share title holders, shall be construed as a separate Residential Customer. The total of the Annual Assessments levied hereunder shall be assessed to the taxpayer as defined and provided for in F.S. § 192.037, as amended from time to time, or as otherwise provided by law.

(g) Annual Assessments levied hereunder shall be made separate for each condominium parcel as provided by F.S. § 718.120, as amended from time to time, and each such condominium parcel shall be deemed a Residential Customer.

(h) Sarasota County shall not issue a Certificate of Occupancy for ~~improved~~ Residential Real Property, whether new construction or a change in the use of property from another category to ~~improved~~ Residential Real Property, until such issuance has been approved by the Solid Waste Management Department, who shall grant approval upon the following circumstances:

(1) The property for which the Certificate of Occupancy is requested is listed on the then current tax roll; or

(2) If the property is not on the then current tax roll, upon payment in full to Solid Waste Management Department of an amount representing the pro rata portion of the current Annual Assessment plus an additional 12 months for each residential class of property. The Solid Waste Management Department shall compute and publish a schedule reflecting the pro rata payment in effect for each month of the current fiscal year. The

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amount of each month's payment shall be the average of what would be the daily pro rata payments for that month. The County shall collect the pro rata portion of the Solid Waste Annual Assessment plus an additional 12 months prior to the time a Certificate of Occupancy is issued and shall collect a transaction fee on Certificates of Occupancy where Solid Waste Annual Assessments are collected on behalf of the Solid Waste Management Department.

(3) Solid Waste Annual Assessments which are processed by the County for an incorrect amount shall be corrected and the amount of the error shall either be refunded or collected. Provided however, that if the correction is for less than $5.00, no collection will be made and a refund will be made only upon a specific request from the ~~customer~~ Customer.

(i) Upon receipt of the same by the Board ~~of County Commissioners~~ from the Tax Collector, all Annual Assessments and other charges levied and collected herein, shall be distributed to the Governing Body for the Solid Waste Service District(s). ~~For services performed during the previous month, the Governing Body shall distribute to the Franchisee, an amount equal to 1/12 of the approved annual payment per Customer, plus adjustments for Customers added subsequent to the establishment of the approved annual payment per Customer and corrections in errors or omissions in the tax roll~~.

(j) All Annual Assessments shall fund the costs for providing and administering the residential programs under this Article ~~managed by Solid Waste Management~~, including, but not limited to, the Collection, Processing and/or disposal of Residential Waste, E-Waste ~~Computers and Electronic Equipment~~, used oil, used oil filters, and ~~tires~~ Tires ~~including tires with rims~~; Code Enforcement; Keep Sarasota County Beautiful; Illegal Dumping; ~~Lawn Mowing;~~ and Hazardous Waste Management Programs.

(1) The Surcharge for Solid Waste programs shall be established by resolution of the Board at a public hearing and shall be added to the Landfill Tipping Fee to fund the costs of administering programs and enforcing the provisions of this Article ~~Ordinance~~. Municipalities shall be exempt from portions of the Surcharge.

(2) All Surcharges shall be disbursed only for the operations of the Solid Waste Management Department.

(3) The Solid Waste Management Department funds shall at all times remain separate and distinct from County General Revenue Funds.

(4) Any and all Solid Waste Management Department funds at the end of a fiscal year shall automatically become the beginning balance of each succeeding fiscal year.

(5) Special Assessments for Disaster Debris pick-up or such other services as determined by the Board shall be established by resolution of the Board at a public hearing and shall be added to the annual tax bill.

SECTION 15. Section 106-43 of the Code is hereby amended to read as follows:

Sec. 106-43. - Correction of errors and omissions.

(a) No act of error, omission or commission on the part of the Property Appraiser, Tax Collector, Governing Body, Executive Director, Board, Clerk, or their deputies or employees, or other Board designee shall operate to defeat the payment of the annual collection of Annual or Special Assessments imposed by the Board under the provisions of this Article ~~Ordinance~~. However, any errors or omissions or commissions may be corrected at any time by the Solid Waste Service District(s) in like manner as the initial performance of such acts and when so corrected, they shall be construed as ~~in~~valid ab initio and shall in no way affect any legal process for the enforcement of the Annual or Special Assessments levied under the provisions of this Article ~~Ordinance~~.

(b) Any owner of real property may petition the Board to correct any asserted error, omission or commission in relation to his property in the adoption of the Annual or Special Assessment roll. Such petition shall be initiated by filing with the Board or its designee, a written petition containing the name of the owner, a legal description of the real property affected, a summary description of the asserted error and the relief requested of the Board. There is no filing deadline for an appeal. However, property owners should take into account the established statutory limitation on the refunds of paid assessments. The Solid Waste Service District(s) will respond to the property owner in writing within 60 calendar days of receipt of the written complaint.

(c) The Governing Body shall have the authority, at any time, upon its own initiative or in response to a petition from any affected owner, or lessee of Improved Real Property, to correct any error in the adoption of any Annual or Special Assessment roll or addendum thereto.

~~(d) When it shall appear that any Annual or Special Assessment was imposed under this Ordinance against any parcel of improved Residential Real Property in error, the Executive Director shall amend the Solid Waste tax roll during the fiscal year in which the error is discovered and the record owner of such parcels shall receive a refund of past Annual or Special Assessment charges as in accordance with established statutory limitations.~~

~~(e) When it shall appear that Annual or Special Assessment should have been imposed under this Ordinance against any parcel of improved Residential Real Property, but such parcel of Improved Real Property was omitted from the roll, or any addendum to such roll, the parcel shall be added by Executive Director to the Solid Waste tax roll during the fiscal year in which the omission is discovered and such parcels shall be assessed for past Annual or Special Assessment charges due and will include charges incurred during the current fiscal year. Parcels of Improved Real Property which have been resold shall be assessed for past Annual or Special Assessment charges commencing with the sale date forward.~~

No adjustments will be made to the existing Annual or Special Assessment for a parcel of Residential Real Property that has been approved for both a demolition permit of an existing structure and a permit for new construction.

SECTION 16. Section 106-44 of the Code is hereby amended to read as follows:

Sec. 106-44. ~~- Responsibilities of the authorized collectors.~~ [Reserved.]

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~~Temporary exemptions granted pursuant to Ordinance No. 86-35 shall expire on either November 20, 2007, when the Authorized Collector's transport equipment is fully depreciated, or when the Authorized Collector fails to comply with this Ordinance, whichever comes first. At the time the exemption terminates, Authorized Collectors shall no longer be allowed to collect, dispose or process their own Solid Waste, Yard Trash and Program Recyclables.~~

~~(a) It shall be the responsibility of all Authorized Collectors to haul and dispose properly of their Solid Waste, Program Recyclables and Yard Trash in accordance with this Ordinance, and at Designated Site(s).~~

~~(b) Authorized Collectors shall not mix Solid Waste, Yard Trash, Program Recyclables, or other materials intended to be collected separately, during the Collection process.~~

~~(c) The Executive Director or his designee shall have the right to inspect the operations and equipment of all Authorized Collectors at any reasonable time and shall be admitted to make such inspections.~~

~~(d) Authorized Collectors shall submit an annual report to the County stating the monthly tonnage, annual total tonnage; and proof of insurance. Furthermore, Authorized Collectors shall provide, within 60 days of the effective date of this ordinance, evidence of the following:~~

~~(1) The original application.~~

~~(2) Original equipment on the application.~~

~~(3) A list of the depreciation on each piece of equipment on the original application.~~

~~(e) In no event shall new or used equipment be allowed to substitute for the equipment in the original approved application.~~

~~(f) Authorized Collectors shall cooperate with the Executive Director in providing every reasonable opportunity for ascertaining whether or not the duty and responsibilities of the Authorized Collector are being performed.~~

~~(g) Authorized Collectors shall not conduct collection services for their own Solid Waste, Yard Trash, or Recyclables if located within 200 feet of another Residential Real Estate Property prior to 6:00 a.m. or after 8:00 p.m. unless authorized by the Executive Director.~~

~~(h) In areas specifically designated by the Executive Director, based on complaints due to noise, the Authorized Collector shall not conduct collections service prior to 7:00 a.m. or after 8:00 p.m.~~

~~(i) Authorized Collectors shall use only vehicles with bodies which are water tight to a depth sufficient to prevent discharge of accumulated water during loading and transport operations, with solid metal sides, and covered metal top. The collector shall provide sufficient equipment, of a nature suitable to the type of service being provided, to maintain regular schedules of Collection and to promptly and efficiently perform his duties under the rules and regulations. As an alternative to a fully enclosed metal top, the Authorized Collector's vehicles may be equipped with a cover~~

~~which is net with mesh not greater than one and one-half inches, or tarpaulin, and such cover shall be kept in good mechanical order and used to cover the Load traveling to and from the loading operation or where parked if the contents are likely to be scattered if not covered.~~

~~(j) Authorized Collector's vehicles shall not be overloaded so as to scatter Solid Waste, Yard Trash or Program Recyclables; but, if said material is scattered from said vehicle for any reason, it shall be the responsibility of the Authorized Collector to immediately pick up such scattered material.~~

~~(k) Authorized Collectors shall insure performance as specified by this Ordinance.~~

~~(l) Authorized Collectors shall designate in writing to the Executive Director the Person to serve as the Collector's agent, and shall provide a process for receiving and handling emergency calls both during and after normal operating hours, such process subject to the Executive Director's approval.~~

~~(m) The Executive Director is authorized to start the administrative procedures to recommend the revocation of a temporary exemption of any Authorized Collector if any of the following conditions exist:~~

~~(1) Refusal to comply with any lawful order of the Board entered after a public hearing; or~~

~~(2) Violations or failure to comply with any provision of Sarasota County ordinances, any rules and regulations promulgated there under relating to the Collection of Solid Waste, or any state or federal law relating to the Collection (including disposal costs) of Solid Waste; or~~

~~(3) Willful failure to file any report required hereunder.~~

~~(n) Revocation proceedings recommended by the Executive Director may be commenced by the Board, in its legislative capacity, at any regular meeting, by the adoption of a resolution, specifying the grounds to be considered by the Board for revocation, and the date, time and place of a public hearing to be held thereon, which resolution shall be served upon the Authorized Collector not less than 20 calendar days prior to a public hearing thereon. The Board may, for good cause, enlarge the time.~~

SECTION 17. Section 106-45 of the Code is hereby amended to read as follows:

Sec. 106-45. - Responsibilities of all haulers.

(a) Haulers shall not conduct collection services for Recyclable Materials, Yard Trash, Construction and Demolition Debris or other materials~~, if Customers are located within 200 feet of Residential Real Estate Property,~~ prior to 6:00 a.m. or after 8:00 p.m. unless otherwise authorized by the Executive Director.

(b) ~~In areas specifically designated by the Executive Director, based on complaints due to noise, Haulers shall not conduct collection services prior to 7:00 a.m. or after 8:00 p.m.~~ *Hauling*

of Franchise Materials. Non-Franchise Haulers shall not engage in the hauling of franchised Waste Streams as described in Section 106-41.

(c) *Littering.* Haulers' vehicles shall not release Litter in violation of the "Florida Litter Law", F.S. § 403.413. If Solid Waste, Recyclable Materials, Yard Trash or other Litter is released or falls from a Hauler's vehicle for any reason, the Hauler shall immediately stop the vehicle and retrieve the Litter.

~~(d) *Combining Materials Prohibited.*~~

~~(1) Haulers shall not combine Solid Waste, Yard Trash, Disaster Debris, Program Recyclables, used oil and used oil filters, tires, Land Clearing Debris, C&D Debris, Additional Recyclables, White Goods or other materials intended to be collected separately, during the Collection process. Additionally, while Dual Stream Recycling is in effect. Paper Program Recyclables shall not be combined with Container Program Recyclables. Dual Stream Recycling will continue to be in effect until the Executive Director issues a Notice of Single Stream Recycling, which will authorize the collection of commingled Program Recyclables in a Recycling Cart. Also, if the Hauler was contracted to provide Collection of separated Recyclable C&D Debris, then the Hauler shall not combine Nonconforming Materials with the separated Recyclable C&D Debris. Additionally, Haulers shall not combine E-Waste Computers and Electronic Equipment collected from the residential Waste Stream with other materials. Haulers shall not combine Hazardous Waste, Biological Waste, Biomedical Waste, Radiological Waste, or combine the items listed in the beginning of this subsection.~~

~~(2) Haulers shall visually inspect each Customer's Recycling Container. If the Hauler finds Recyclable Materials have been combined with Nonconforming Materials, the entire Recycling Container shall be tagged and shall not be collected until the Recycling Container is free of Nonconforming Material. Hauler shall notify the County of tagged Containers.~~

(d) *Commercial Containers.* All Haulers shall place, empty, and/or remove commercial containers with minimal force in a manner not to damage the collection container and/or property. Containers shall be placed in a manner that permits the Customer to freely operate container closures after placement.

(e) *Responsibilities for Hauling Yard Trash.* All Yard Trash ~~dispersed~~ generated within unincorporated Sarasota County must be delivered to a Yard Trash Recycling Facility. For the purpose of imposing penalties pursuant to Section 106-60, each Load not delivered to a Yard Waste Recycling Facility shall constitute a separate offense.

~~(g) *Responsibilities of Private Haulers Collecting Commercial Customer Program Recyclables.* Private Haulers are required to visually inspect each Commercial Customer's Recycling Container to ensure that Program Recyclables are not mixed with Nonconforming Materials or Additional Recyclables. If the Private Hauler finds Program Recyclables have been mixed with Nonconforming Materials and/or Additional Recyclables, the entire Recycling Container shall be tagged and shall not be collected until the Customer removes such material and~~

~~properly recycles or disposes of them. Solid Waste Management shall work closely with Private Haulers to ensure achievement of Solid Waste Management Recycling goals and implementation of program.~~

(fg) *Responsibilities of Construction and Demolition (C&D) Debris Haulers.* All mixed Recyclable C&D Debris generated ~~dispensed~~ within unincorporated Sarasota County must be delivered to a C&D Debris ~~Recycling~~ Facility. If Haulers separate or cause to be separated Recyclable C&D Debris from nonrecyclable C&D Debris at the job site, any sorted Recyclable C&D Debris generated ~~dispensed~~ within unincorporated Sarasota County must be delivered to a processor or end market that accepts the Recyclable Material. For the purpose of imposing penalties pursuant to Section 106-60 herein, each Load of Recyclable C&D Debris generated ~~dispensed~~ within unincorporated Sarasota County that is not delivered to a C&D Debris ~~Recycling~~ Facility shall constitute a separate offense.

(gh) *Responsibilities of Franchisee.* The Franchisee shall be responsible for complying with this Article ~~Ordinance~~ as well as the Franchise Agreement signed by the Board. In the event of a direct conflict between this Article ~~Ordinance~~ and the Franchise Agreement, the provisions of this Article ~~Ordinance~~ shall prevail.

~~(1) *Transition.* For purposes of this subsection (1), in the event a new hauler is awarded the Franchise Agreement, the term "Outgoing Franchisee" shall refer to the Franchisee whose franchise term is near expiration and the term "Incoming Franchisee" shall refer to the newly selected Franchisee.~~

~~a. *Transition Prior to the Commencement Date of the Franchise Agreement.* The Incoming and Outgoing Franchisees understand and agree that the time between the formal Franchise Agreement signing and commencement date of the Franchise Agreement is intended to provide the incoming Franchisee with sufficient time to, among other things, order equipment and prepare necessary routing changes. Incoming Franchisee shall provide to the County purchase orders or other documentation approved by the County satisfying that arrangements have been made to have all necessary equipment delivered to Incoming Franchisee's equipment yard no later than 60 days prior to the commencement date of the Franchise Agreement. Incoming Franchisee shall be responsible for the provision of all Collection Services beginning on the commencement date of the Agreement. The County and the Incoming Franchisee shall agree upon a transition plan and schedule. Noncompliance with such dates for completion or other elements of the transition plan shall result in the County levying the transition penalties as set forth in the Franchise Agreement.~~

~~b. *Transition upon implementation of automated Collection.* In the event the County chooses to implement an automated Collection system, whether as a pilot program in one portion of the Service Area or in the entire Service Area, the Franchisee and County shall agree upon the timeline and the elements of a transition plan and schedule. Furthermore, the County and Franchisee shall agree upon the liquidated damages associated with the Franchisee not complying with said plan or schedule.~~

c. *Transition upon Expiration of the Franchise Agreement.* When requested by the County, the Outgoing Franchisee shall turn over information such as, but not limited to, route sheets, Residential Customer and Commercial Customer lists (including container sizes and frequency of Collection), and other information that shall allow for a smooth transition of service from the Outgoing Franchisee to the Incoming Franchisee. Outgoing Franchisee shall make its best reasonable effort to ensure the transition occurs without inconvenience to the County or Customers. Outgoing Franchisee shall also allow the Incoming Franchisee to purchase, or rent for up to 90 days, containers from Outgoing Franchisee. The purchase price shall be negotiated, but shall be no more than the fair market value of the containers. The rental rate shall not exceed average industry rates.

(2) *Financial Reporting Requirements.*

a. The Franchisee is required to provide an annual report to the Executive Director indicating quantities and condition of resources for the purpose of informing the Executive Director of equipment, facilities, manpower, and other resources the Executive Director deems necessary for planning for emergency conditions.

b. The Franchisee shall file all reports and audits in a timely manner. Willful delay in filing reports and audits shall be construed as a default in the Franchise.

c. The Franchisee shall provide information, data, and reports in a format and at frequencies designated by the Executive Director, including, but not limited to, quarterly and annual reports. Work papers of the Franchisee's auditor shall be made available to the County upon request by the Executive Director.

d. The Franchisee shall provide an Audited Financial Statement for the most recently completed corporate year.

e. The Franchisee shall provide supplemental schedules, which shall include but not be limited to:

1. Customer counts for all Service Categories by the month and summarized for the year.

2. For each Commercial Customer, Franchisee shall report the address, size and number of containers, owner of the containers, and frequency of Collection.

3. The Franchisee shall provide any other information which the Executive Director or the Franchisee may deem relevant under the particular circumstances.

4. Unless otherwise determined with the Director at the time of filing, the Franchise shall submit with the annual report, supplemental schedules, and an Audited Financial Statement with an unqualified opinion as prepared

by a certified public accountant. The Franchisee shall submit a hard copy of the annual report as well as an electronic version in a format approved by the County, using a computer software program compatible with the County's software.

(3) *Other Reporting Requirements.*

a. Franchisee shall submit complaint reports as described below, in Section 106-50, and as directed in the Franchise Agreement.

b. Franchisee shall provide a Set Out report of all Class I Customers for Residential Program Recyclables Collection Service, as directed in the Franchise Agreement.

c. At the time of delivery, the driver of any Franchisee vehicle shall provide the operator of the Designated RMPF, the operator or the Designated Disposal Site or the Executive Director with a copy of the daily route sheet for that day upon request of said operator or the Executive Director.

d. The Franchisee shall provide to the County a report regarding the Collection of Program Recyclables and the use of the Designated RMPF. Such report shall include the number of trucks to be used in the Collection of Program Recyclables, the identification number of each truck, indication of the facility said trucks anticipate delivering Program Recyclables (e.g. Jackson Road Transfer Station or the RMRF), and the anticipated time of tipping at the Designated RMPF. Such report shall be continuously updated to reflect any changes in any of the above information, and an updated report delivered to the County when any changes occur.

e. The rate of providing new, replacement, and additional Recycling Bins to Residential Customers shall be separately accounted for by the Franchisee and reported monthly to the County, as directed in the Franchise Agreement. Said report shall include:

1. The total number of bins dispensed for Class I Customers;

2. The total number of bins dispensed for Class II Customers;

3. The ratio of bins dispensed to Class I Customers over the total Class I Customer count; and

4. The ratio of bins dispensed to Class II Customers over the total Class II Customer count.

SECTION 18. Section 106-46 of the Code is hereby amended to read as follows:

Sec. 106-46. - Residential customer classifications.

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Differences exist as to the quantity of Residential Waste generated, and whether mechanically serviced containers (Class II Containers or Class II Recycling Containers) or individual containers (Curbside Containers) are used. Therefore, two classes of properties are established within the Solid Waste Service District(s) for the purpose of allocating the cost of providing service and establishing the appropriate assessments.

(a) The following types of Improved Real Property within the Solid Waste Service District(s) shall be assigned Class I Customers:

(1) Single-family.

(2) Duplex and triplex.

(3) Quadruplex.

(4) Apartments, 2—9 Dwelling Units.

(5) Retirement homes with no commercial kitchen, 2—9 Dwelling Units and each unit does not have a separate cooking facility/kitchen.

(6) Retirement homes with no commercial kitchen, 2—9 Dwelling Units.

(7) Residential combination residence and store.

(b) The ~~Board determines that the~~ following types of Improved Real Property ~~real property~~ within the Solid Waste Service District(s) shall be assigned Class II Customers:

(1) Mobile homes.

(2) Recreational vehicles.

(3) Condominiums.

(4) Cooperatives.

(5) Apartments, 10+ Dwelling Units.

(6) Retirement homes, 10+ Dwelling Units and each unit has a separate cooking facility/kitchen.

(7) Time shares.

(8) Mobile home parks including lots for mobile homes and recreational vehicles.

SECTION 19. Section 106-47 of the Code is hereby amended to read as follows:

Sec. 106-47. - Responsibilities of the customers.

All property owners of Improved Real Property are mandated to subscribe to Residential Waste Collection Service or Commercial Waste Collection Service, as appropriate, and shall be subject to assessments, Rates and Fees.

(a) *General Provisions.*

(1) All properties designated Class I shall be charged the same Annual Assessment rate within the same Solid Waste Service District(s).

(2) All properties designated Class II shall be charged the same Annual Assessment rate within the same Solid Waste Service District(s).

(3) Only properly prepared Residential Waste, E-Waste ~~Computers and Electronic Equipment~~, used oil, used oil filters, and ~~tires~~ Tires ~~including tires with rims~~ generated from the Residential Real Property are included in the basic service. Improperly prepared Residential Waste, which includes but is not limited to mixing Solid Waste and Yard Trash, shall be tagged and rejected by the Franchisee as directed by the Solid Waste Management Department. The tag shall clearly indicate the reason for the rejection, with information which will allow the Customer to correct the problem for future Collections.

(4) Only properly prepared Commercial Waste generated from the Commercial Real Property are included in the basic service. Improperly prepared Commercial Waste, which includes but is not limited to mixing Solid Waste, Yard Trash or Recyclable Materials shall be tagged and rejected by the Franchisee as directed by the Solid Waste Management Department. The tag shall clearly indicate the reason for the rejection, with information which will allow the Customer to correct the problem for future Collections.

(5) ~~Residential~~ Customers may use container(s) as described below for Solid Waste, Program Recyclables and Yard Trash Collection. The ~~resident~~ Customer shall not maintain or permit on the property a public nuisance injurious to the health as defined herein.

(6) The Executive Director may authorize Curbside Collection, including the use of Recycling Bins or Carts for the Collection of Program Recyclables, for Class II Residential Customers ~~Class II~~ where efficiency and other circumstances require.

(7) The Executive Director may authorize the use of Class II Containers and Class II Recycling Containers by Class I Customers where efficiency and other circumstances require.

(8) Residential Customers and Commercial Customers should either contract for special pick up service or should deliver or cause to be delivered each type of Additional Recyclable Materials to ~~its~~ their respective Recycling Facility, center, or receiving area, as appropriate.

(9) Land Clearing Debris may be burned when done consistent with County, State and Federal Regulations.

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(10) Residential Real Property ~~property~~ on which Commercial Activity and residential activity is generating Solid Waste which exceeds an average of three Curbside Containers per week or Program Recyclables which exceed an average of two Recycling Containers per week shall be required to subscribe to Commercial Collection Service. The Solid Waste Management Department shall report such activity to Code Enforcement for compliance. Use of Commercial Collection Service shall not waive enforcement action by Code Enforcement or otherwise ~~any other County department~~ for violation of Sarasota ~~other~~ County Code, rules, regulations, polices or procedures or other applicable laws ~~Ordinances~~.

(11) ~~Class I~~ Residential Customers with a lawfully-operating home occupation, as defined by Sarasota County Code, shall meet all zoning regulations and shall not generate quantities of Program Recyclables which exceed the capacity of the Recycling Containers.

(12) It shall be required of property owners or occupants not considered Residential Customers to dispose of their Commercial Waste by entering into an agreement with the Franchisee for Collection of all Commercial Waste. Property owners or occupants not considered Residential Customers may jointly enter into mutual agreements with the Franchisee for Collection of Solid Waste, Yard Trash, and Recycling Collection Service. Such Property owners or occupants may also jointly enter into mutual agreements with any authorized Hauler of Recyclable Materials.

(13) Commercial Customers shall pay the Board-approved Rates included in the Franchise Agreement, as adjusted, for the collection and disposal of Commercial Waste.

(14) Each Customer must pay his respective financial obligation for the service provided.

(15) Commercial Customers may use the most efficient container for their situation (Curbside Containers~~, 90-gallon containers,~~ or Commercial Containers).

(16) When necessary to carry out the purpose and intent of this Article ~~Agreement~~, the Executive Director may authorize the placement of Recycling Containers off the Premises. The use of public rights-of-way may be used only in circumstances where the placement of Recycling Containers shall not interfere with or obstruct the primary purpose of the right-of-way.

(17) Recycling Containers containing visible amounts of Nonconforming Materials, Additional Recyclable Materials, and/or contaminated recyclables shall be rejected by the Franchisee or Private Hauler and tagged. The tag shall clearly indicate the reason for the rejection, with information which will allow the Customer to correct the problem for future Collections.

(18) If the Franchisee or Private Hauler tags and rejects the contents of any Collection Container, the Customer shall remove the materials as indicated and shall dispose of or recycle such material as required by this Article ~~Ordinance~~. Franchisee shall notify the County within 24 hours of tagging the materials.

(19) Collection Containers and Recycling Containers shall be kept reasonably clean ~~and Recycling Containers shall be properly labeled~~.

(20) ~~Recycling Containers shall be used exclusively for the containment of Program Recyclables and shall not be used for any other purpose, including, but not limited to, gardening uses, storage of wood, tools or laundry baskets.~~

~~(21)~~ If the Customer regularly generates Program Recyclables in an amount that cannot be contained in the Recycling Container, the Customer shall be required to make arrangements with the Franchisee or Private Hauler to obtain additional approved Recycling Container(s).

(21~~22~~) Plastic bags shall not be utilized in lieu of or within Recycling Containers and, beginning May 1, 2023, shall not be used as a container for Yard Trash collection.

(22~~23~~) Customers shall prepare Corrugated Cardboard for Recycling in a size not to exceed two feet by three feet., ~~or~~ Customers may call the Franchisee for a special Collection. Failure to comply with these requirements shall subject the User to the penalties provided for by this Article ~~Ordinance~~. Franchisee shall provide Residential Customers with a courtesy ~~one-time~~ unprepared special Collection(s) of Corrugated Cardboard for "move ins" at no charge.

(23~~24~~) All Class II unit owners, or agents, shall post a notice ~~provided~~ approved by the Solid Waste Management Department in each unit that is rented or leased for periods of three months or less. The notice shall include at a minimum all of the mandatory Recycling requirements for Program Recyclables. Such notice shall also be posted in the Garbage and Recycling Container Area when a centralized area is used for Collection.

(24~~25~~) All new Class II structures shall contain a designated Recycling Container area which shall provide adequate space for storage of Recycling Containers and Collection by the Franchisee. Such area shall conform to the Sarasota County Land Development Regulations and shall meet the requirements described in Section 106-47(c~~d~~)(5) below.

(25~~26~~) ~~Mobile home parks~~ Class II Customers shall use either centralized Recycling Containers~~. Recycling Bins, or Recycling Carts~~ or Curbside Containers as authorized by the Executive Director~~, and shall be subject to all provisions governing Class II Customers~~.

(26~~27~~) All Commercial Waste shall be containerized, regardless of which container size or type of service the Commercial Customer receives.

(27~~28~~) Commercial Customers, if in unincorporated Sarasota County, shall contract with a Private Hauler for Collection Services of Program Recyclables or shall deliver directly or cause to be delivered such Recyclable Materials to a Recycling Facility.

(28~~29~~) If dispersed within unincorporated Sarasota County, Commercial ~~Users~~ Customers shall either contract for Collection Service or shall deliver or cause to be delivered directly all Recyclable C&D Debris to a C&D Debris ~~Recycling~~ Facility.

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(2930) Where several Commercial Customers are within close physical proximity of each other, such as in the same shopping center, or the same mall, such Customers may enter into a joint agreement to contract with the Franchisee to collect their Commercial Waste and/or Recyclable Materials or with a Private Hauler to collect only their Recyclable Materials.

(3031) All new commercial structures shall designate an area for Recycling Containers which shall be screened on three sides in such a manner that Recycling Containers are not visible from the street on which they are situated or from adjacent residentially zoned properties. Such area must be designed to accommodate Hauler trucks. Such area must be designed so as to accommodate all of the Recycling Containers. Such area shall conform to the requirements put forth by the Unified Development Code, and shall meet the requirements described in Section 106-47(eg)(5) below.

(3132) All disputes between the Customer and Franchisee shall be resolved by the Solid Waste Management Department Director ~~the Executive Director~~. Any decision may be appealed to the Executive Director ~~County Administrator~~.

(3233) Customers desiring Supplemental Collection Services, shall request such services directly from the Franchisee. The specific arrangements for Supplemental Collection Services are to be determined between the Customer and the Franchisee. Fees for said service shall be in accordance with the Franchise Agreement Fees approved by the Board, and shall be billed directly to the Customer by the Franchisee. No such services shall be provided until the Franchisee notifies the Customer of the amount of the Fee and receives the Customer's confirmation that the Fee is acceptable.

(3334) The Franchisee is not required to furnish Collection Services on Christmas, New Year's Day, July 4th, Labor Day, Thanksgiving, and any other holiday as approved by the Executive Director. The Franchisee is required to notify all Customers whose normal Collection day falls upon such day that no Collection Service will be provided and the date of the alternate Collection day in accordance with the Solid Waste Management Department's directive.

(b) *~~Residential~~ Customers utilizing Curbside Container Collection.*

(1) Curbside Customers shall provide and utilize Curbside Containers which do not exceed 40 pounds in weight for Manual Collection and do not exceed the weight posted on the cart for Automated Collection when full ~~when filled with Solid Waste or Yard Trash~~. Residential Solid Waste may ~~also~~ be placed in plastic bags outside of a Curbside Container under a Manual Collection service but such placement outside of an Automated Collection Container shall not be permitted under an Automated Collection service.; ~~and in order of preference, r~~Residential Yard Trash ~~should~~ may be placed in a rigid container, ~~and may also~~ be bundled and tied as described herein, or placed in ~~plastic~~ paper bags. Beginning May 1, 2023, the ~~The~~ use of plastic bags for Yard Trash is prohibited ~~discouraged~~. Solid Waste and Yard Trash shall not be placed in the same Curbside Container.

(2) For the Automated Collection of Solid Waste, Program Recyclables, or Yard Trash, Customers shall utilize Curbside Containers provided by the Franchisee. Such containers shall be used exclusively for collection. All bags, boxes, containers, or other items to be collected must be placed inside the Automated Containers. All containers must be maintained in a clean, neat, and sanitary condition at all times.

(3) Automated Collection Containers owned by the Franchisee are, and shall remain, the sole property of the Franchisee. It shall be unlawful and a violation of this Article for any Person to use such containers for any other purpose than storing Solid Waste, Program Recyclables, or Yard Trash for collection; to intentionally damage or destroy such containers, or to fail to return such containers to the Franchisee when no longer used for such purpose. Automated Collection Containers owned by the County are, and shall remain, the sole property of the County. It shall be unlawful and a violation of this Article for any Person to use such containers for any other purpose than storing Solid Waste, Program Recyclables, or Yard Trash for collection; to intentionally damage or destroy such containers, or to fail to return such containers to the County when no longer used for such purpose. Residential Automated Collection Containers shall remain with the Residential Real Property unless the Executive Director directs otherwise.

(4) Franchisee will not be responsible for Unintentional Damage to or loss of Customer-owned Curbside Containers which exceed 40 pounds in weight ~~when filled with Solid Waste or Yard Trash~~. If the Franchisee does not collect such containers due to excessive weight, the Franchisee shall tag the Curbside Containers, and shall notify the County within 24 hours of tagging said container. The tag shall clearly indicate the reason for the rejection, with information which will allow the Customer to correct the problem for future Collections.

(5) Franchisee will not be responsible for collecting Automated Curbside Containers which exceed the weight posted on the cart. If the Franchisee does not collect such containers due to excessive weight, the Franchisee shall tag the Curbside Containers, and shall notify the County within 24 hours of tagging said container. The tag shall clearly indicate the reason for the rejection, with information which will allow the Customer to correct the problem for future Collections.

(6) Franchisee shall not be responsible for theft or damage to unapproved Curbside Containers, carts, or other containers used as Curbside Containers. Containers must be removed from devices used to move Solid Waste, Program Recyclables or Yard Trash prior to collection. All devices used to close such containers such as straps or bungee cords must be removed prior to Collection.

(7~~3~~) Curbside Containers shall be constructed so as to prevent intrusion of water and the expulsion of its contents, with covers free from sharp edges or inside structures which will prevent the free discharge of its contents.

(8~~4~~) Plastic, or other impervious bags, sufficient in strength for handling by the Franchisee may be utilized for Solid Waste so long as they are closed and unbroken at the

time of Collection. Beginning May 1, 2023, the ~~The~~ use of plastic bags for Yard Trash is prohibited ~~discouraged~~.

(~~9~~5) Recycling Containers and cardboard boxes shall not be used as containers for Solid Waste or Yard Trash.

(10~~6~~) The Customer shall place Solid Waste in one or more Curbside Containers. Yard Trash shall be placed in one or more Curbside Container(s). Yard Trash shall be placed in separate Curbside Containers from Solid Waste. Yard Trash placed in Curbside Containers shall not exceed four feet in length ~~height~~, and shall be no more than 12 inches over the top of the Curbside Container. Solid Waste or Yard Trash shall not be placed in Recycling Containers.

(11~~7~~) Solid Waste or Yard Trash not placed in Curbside Containers shall be placed by the Customer at the ~~permitted~~ designated Collection point and shall include only items in size not exceeding four feet in length and 16 inches in diameter and 40 pounds in weight, and when applicable shall be securely tied by a material strong enough to support the weight of the bundle.

(12~~8~~) Customers shall notify the Franchisee of the need for Bulk Waste Collection Service 48 hours prior to the scheduled Solid Waste Collection day.

(13~~9~~) Customers shall notify the Franchisee of the need for White Goods Collection Service 48 hours prior to the scheduled Solid Waste Collection day. Doors to refrigerators or freezers shall be removed prior to being ~~set out~~ Set Out for Collection.

(14~~10~~) Customers shall notify the Franchisee of the need for E-Waste ~~Computers and Electronic Equipment~~ Collection Service 48 hours prior to the scheduled Solid Waste Collection day.

(15~~11~~) Customers may ~~set out~~ Set Out up to five gallons of used oil placed in ~~clear~~ plastic containers marked as "used oil" with screw-on lids, and up to five oil filters placed in clear zip-lock plastic bags for Collection on each scheduled Solid Waste Collection day.

(16~~12~~) Customers may ~~set out~~ Set Out up to four automotive Tires ~~tires~~, on or off the rim, of up to 25 inches in diameter, for Collection on each scheduled Solid Waste Collection day.

~~(13) Class I Customers shall place Curbside Containers, Recycling Containers and un-containerized Residential Waste (e.g., Bulk Waste, White Goods, etc.) at a point within the parkway abutting such residence no farther than three feet from the nearest public or private way, or in the case of the existence of a drainage ditch, at a point within said dimensions adjacent to the nearest driveway. Class II Customers utilizing such service shall place Curbside Containers, Recycling Containers and un-containerized Residential Waste at the permitted Collection point.~~

(17~~14~~) Curbside Containers, Recycling Containers, and ~~un-containerized~~ other Residential Waste shall be placed ~~at the curb~~ Curbside by 6:00 a.m. of the designated Collection day to ensure Collection.

(18~~15~~) Curbside Containers, Recycling Containers and ~~un-containerized~~ other Residential Waste shall not be placed at the curb earlier than 5:00 p.m. of the day prior to the designated Collection day. All emptied containers shall be returned to proper storage on the Premises no later than 10:00 a.m. on the day following the designated Collection day. Curbside Containers ~~and Recycling Bins~~ shall be stored between Collection days in the side or rear yard and not Front Yard. Public easements and rights-of-way are not to be used as a storage location for Curbside Containers ~~or Recycling Containers~~. Curbside Containers ~~and Recycling Containers~~ shall be stored within the perimeter of privately owned property.

(19~~16~~) ~~While Dual Stream Recycling is in effect,~~ Under a Dual Stream Recycling program, Curbside Customers shall place only Paper Program Recyclables into a Recycling Container ~~Bin~~ that is designated for paper, and only Container Program Recyclables in a Recycling Container ~~Bin~~ that is designated for such. The contents of one Recycling Container ~~Bin~~ shall not be mixed with the contents of the other Recycling Container ~~Bin~~. ~~Dual Stream Recycling will continue to be in effect until the Executive Director issues a Notice of Single Stream Recycling, which will authorize the collection of commingled Program Recyclables in a Recycling Cart.~~ Corrugated Cardboard shall be flattened and placed neatly beside, in, or between the two Recycling Containers ~~Bin~~. ~~Curbside Customers are encouraged to not set at Curbside the paper Recycling Bin on rainy days. They are also encouraged to place the bottles and plastics Recycling Bin on top of the paper Recycling Bin to prevent the paper from getting saturated.~~ Bundled Corrugated Cardboard shall not exceed six inches in height per bundle.

(20) Curbside Customers under Single Stream Recycling Collection shall place all Paper and Container Program Recyclables into the same Recycling Container. Corrugated Cardboard shall be flattened and cut to a size to be placed neatly into the Recycling Container.

(21) It shall be the responsibility of the owners and/or occupants of commercial and Industrial establishments not utilizing commercial containers for collection service to not maintain or permit on the property a public nuisance injurious to the health as defined herein.

~~(17) Curbside Customers with Single Stream Recycling in Recycling Carts shall place all Program Recyclables inside the Recycling Cart. Paper Program Recyclables may be mixed with Container Program Recyclables in the same Recycling Cart. Program Recyclables may not be placed outside of the Recycling Cart.~~

~~(c) *Residential Customers utilizing 90-gallon container Collection.*~~

~~(1) Customers using 90-gallon containers for the Collection of Solid Waste and Yard Trash shall utilize such containers provided by the Franchisee.~~

~~(2) Ninety-gallon containers shall be constructed so as to prevent intrusion of water and the expulsion of its contents, with covers free from sharp edges or inside structures which will prevent the free discharge of its contents.~~

~~(3) Plastic, or other impervious bags, sufficient in strength for handling by the Franchisee may be utilized for Solid Waste and Yard Trash so long as they are closed and unbroken at the time of Collection. The County discourages the use of plastic bags for Yard Trash.~~

~~(4) The Customer shall place Solid Waste and Yard Trash in one or more 90-gallon container(s). Yard Trash shall be placed in separate 90-gallon containers from Solid Waste. Yard Trash placed in 90-gallon containers shall be of a length that allows the lid to the 90-gallon container to remain closed.~~

~~(5) Solid Waste and Yard Trash not placed in containers shall be placed by the Customer at the permitted Collection point and shall include only items in size not exceeding four feet in length and 16 inches in diameter and 40 pounds in weight, and shall be securely tied by a material strong enough to support the weight of the bundle.~~

~~(6) While Dual Stream Recycling is in effect, Residential Curbside Collection Customers shall place only Paper Program Recyclables into one Recycling Container that is designated for paper, and only Container Program Recyclables in the other Recycling Container that is designated for such. The contents of one Recycling Container shall not be mixed with the contents of the other Recycling Container. Dual Stream Recycling will continue to be in effect until the Executive Director issues a Notice of Single Stream Recycling, which will authorize the collection of commingled Program Recyclables in a Recycling Cart.~~

~~(7) Following issuance of the Notice of Single Stream Recycling, Residential Customers shall place all Program Recyclables inside the Recycling Cart. Paper Program Recyclables may be mixed with Container Program Recyclables in the same Recycling Cart. Program Recyclables may not be placed outside of the Recycling Cart.~~

~~(8) Customers shall notify the Franchisee of the need for Bulk Waste Collection Service 48 hours prior to the scheduled Solid Waste Collection day.~~

~~(9) Customers shall notify the Franchisee of the need for White Goods Collection Service 48 hours prior to the scheduled Solid Waste Collection day. Doors to refrigerators or freezers shall be removed prior to being set out for Collection.~~

~~(10) Customers shall notify the Franchisee of the need for Computers and Electronic Equipment Collection Service 48 hours prior to the scheduled Solid Waste Collection day.~~

~~(11) Customers may set out up to five gallons of used oil placed in clear plastic containers with screw-on lids, and up to five oil filters placed in clear zip-lock plastic bags for Collection on each scheduled Solid Waste Collection day.~~

~~(12) Customers may set out up to four automotive tires on or off the rim of up to 25 inches in diameter for Collection on each scheduled Solid Waste Collection day.~~

~~(13) Class I Customers utilizing 90-gallon containers shall place the 90-gallon containers, Recycling Containers and un-containerized Residential Waste at a point no farther than three feet from the nearest public or private way, or in the case of the existence of a drainage ditch, at a point within said dimensions adjacent to the nearest driveway, or as may be agreed between Franchisee and Customer. Class II Customers utilizing such service shall place 90-gallon containers, Recycling Bins and un-containerized Residential Waste at the permitted Collection point.~~

~~(14) Ninety-gallon containers, Recycling Containers and un-containerized Residential Waste shall not be placed at the curb earlier than 5:00 p.m. of the day prior to the designated Collection day. All emptied containers shall be returned to proper storage on the Premises no later than 10:00 a.m. on the day following the designated Collection day. Ninety-gallon containers and Recycling Containers shall be stored between Collection days in side or rear yard and not the Front Yard. Public easements and rights-of-way are not to be used as a storage location for containers. Ninety-gallon containers and Recycling Containers shall be stored within the perimeter of privately owned property.~~

~~(15) Recycling Containers and cardboard boxes shall not be used as containers for Solid Waste or Yard Trash.~~

(c~~d~~) *Residential Customers utilizing Class II Containers ~~containerized (dumpster) Collection~~.*

(1) Residential Customers eligible and using Class II Containers or Class II Recycling Containers may arrange for their own container or one from the Franchisee. Use of a container furnished by someone other than the Franchisee will not act to reduce the Special Assessment. If the ~~customer~~ Customer elects to use their own container(s), the container(s) must be compatible with the Franchisee collection equipment.

(2) Class II Container size and frequency of service must be sufficient to store and dispose of all waste generated within one week. Class II Recycling Container size and frequency of service must be sufficient to store all Program Recyclables generated within one week.

(3) Class II Containers and Class II Recycling Containers or enclosed container areas shall be placed such that they are readily accessible to the Franchisee's vehicle or an extra charge may be imposed by the Franchisee, with the approval of the Board.

(4) Class II Containers and Class II Recycling Containers shall be placed on a paved level surface, preferably a concrete pad six inches thick, and all approaches to container shall be capable of supporting weight of Collection vehicle.

(5) Enclosures for Class II Containers and Class II Recycling Containers are required, unless there is a permanent storage area for such containers inside a walled and roofed building. Enclosures shall have the minimum internal dimensions of 12 feet by 12 feet square, and shall be equipped with gates. The clear opening dimension shall be 12 feet

minimum, and gates must be equipped with an adequate means or device to hold them open. Enclosures with gates must have gate signs which read: NO PARKING. This sign shall not exceed two square feet in total area. Letters must be not less than three inches high and three-quarters inch wide. The sign must be in a contrasting color to the color of the enclosure.

(6) Class II Container and Class II Recycling Container location and approach shall be free of overhead wires, fuel tanks, fuel fill ports, or septic systems, and low hanging branches and tree limbs. Locations shall be designated which maximize economy without sacrificing public health matters and convenience to the Customer. Locations shall be within the perimeter of privately owned property. Public easements and rights-of-way are not to be used as container location without prior written approval from the Executive Director.

(7) If the Class II Container or Class II Recycling Container is inaccessible or blocked, service will be provided on the eCustomer's next regular pick up day unless a special pick up is arranged. Special pick up times can be arranged with the Franchisee at an additional Fee.

(8) Class II Containers and Class II Recycling Containers shall have lettering not less than one and one-half inches high indicating the identification of the owner of the container.

(9) With the exception of aluminum, stainless steel, or other similar materials that do not readily accept painting, Class II Containers and Class II Recycling Containers owned by the Customer must be kept painted at all times so that they do not become a detriment to the community.

(10) Each Customer is responsible ~~for~~ to clean up debris around and in the vicinity of his Class II Containers and Class II Recycling Containers, and shall keep the container closed, the container clean, and the container accessible to Franchisee's vehicles.

(11) Class II Container and Class II Recycling Container lids shall remain closed. Containers shall not be overfilled such that lids cannot be securely closed. In the event containers are overfilled and cannot be safely dumped, Customer will be notified by the Franchisee and service shall be rescheduled. The Franchisee shall also notify the County to this effect. Special pickups can be arranged with the Franchisee at an additional charge.

(12) Class II Customers shall notify the Franchisee of the need for Bulk Waste Collection Service 48 hours prior to the scheduled Solid Waste Collection day.

(13) Class II Customers shall notify the Franchisee of the need for White Goods Collection Service 48 hours prior to the scheduled Solid Waste Collection day. Doors to refrigerators or freezers shall be removed prior to being ~~set out~~ Set Out for Collection.

(14) Class II Customer shall notify the Franchisee of the need for E-Waste ~~Computers and Electronic Equipment~~ Collection Service 48 hours prior to the scheduled Solid Waste Collection day.

(15) Class II Customers may ~~set out~~ Set Out up to five gallons of used oil placed in ~~clear~~ plastic containers marked as "used oil" with screw-on lids, and up to five oil filters placed in clear zip-lock plastic bags for Collection on each scheduled Solid Waste Collection day.

(16) Class II Customers may ~~set out~~ Set Out up to four automotive Tires ~~tires on or off the rim of up to 25 inches in diameter~~ for Collection on each scheduled Solid Waste Collection day.

(17) The Customer shall place all ~~un-containerized~~ other Residential Waste at the Collection point agreed to by the Franchisee and Customer on the Collection day.

(de) *Residential Disaster Debris.*

(1) Residential Customers located on Private Roads or within Gated Communities may receive Disaster Debris collection and disposal services provided that: (a) the area has been designated as a Disaster Area by resolution of the Board; (b) the legal owner(s) or the designated legal representative(s) of the Private Road or Gated Community have executed the County-issued Right-of-Entry/Hold Harmless form and that form remains in full force and effect or FEMA has waived the necessity for such a form. Unless waived, the refusal or inability to sign the Right-of-Entry/Hold Harmless form will result in the non-collection of Disaster Debris and the responsibility for collection of Disaster Debris and all costs incurred for the collection and disposal of the Disaster Debris shall be the responsibility of the property owners residing on the Private Road or within the Gated Community; and (c) the Board or designee has determined that Disaster Debris present within the County, including Disaster Debris on Private Roads and within Gated Communities, is so widespread that it is in the public interest to remove the debris to protect life, ~~the~~ public health, safety and welfare, to reduce the threat of additional damage to improved property, and/or to promote economic recovery of the community at large.

(2) Unless directed otherwise, Property owners located on a public road or a Private Road shall separate all Disaster Debris that is placed at the right-of-way into the following categories for collection:

a. ~~Putrescible~~ gGarbage.

b. Vegetative, woody debris, including, but not limited to, logs, branches, and limbs ~~and leaves~~.

c. Mixed debris, i.e., mixture of household items and other debris not listed.

d. Construction and demolition debris, including, but not limited to, lumber, metal, drywall, concrete block, brick and stucco.

e. White Goods.

f. Household Hazardous Waste.

(3) All Disaster Debris shall be neatly stacked, piled or placed within ~~three feet of~~ the right-of-way.

(4) Disaster Debris shall be placed so that it does not block the roadway, traffic signs and signals or stormwater structures.

(5) Disaster Debris shall be placed so that it is not under power lines or by power poles, on top of water meters or fire hydrants, next to vehicles, mailboxes or fences. Damage resulting to personal property due to the incorrect placement of Disaster Debris at the right-of-way shall be the responsibility of the property owner.

(6) Residents that place Ineligible Debris in the right-of-way for collection shall remove said debris from the right-of-way within 24 hours of notification by the County and shall be responsible for all costs associated with the collection and disposal of the Ineligible Debris, unless it is prepared for pickup as specified in Subsection 106-47(a), (b), or (c) ~~or (d)~~ herein. For purposes of this subsection, "Ineligible Debris" shall mean debris that is not the direct result of a declared Disaster, is not within a designated Disaster Area and/or is not the responsibility of the County to collect.

~~(f) *Commercial Customers utilizing Curbside Container Collection.*~~

~~(1) It shall be the responsibility of the owner(s) and/or occupants of commercial and industrial establishments, not utilizing 90-gallon containers or Commercial Containers for Collection Service, to provide approved Curbside Container(s) adequate to contain all Solid Waste and Yard Trash generated from the Commercial Customers. The owner shall not maintain or permit on the property a public nuisance injurious to the health as defined herein.~~

~~(2) Curbside Containers shall be constructed so as to prevent intrusion of water and the expulsion of its contents, with covers free from sharp edges or inside structures which will prevent the free discharge of its contents.~~

~~(3) Plastic, or other impervious bags, sufficient in strength for handling by the Franchisee may be utilized for Solid Waste, so long as they are closed and unbroken at the time of Collection. Yard Trash may be placed in rigid containers, or bundles in size not exceeding four feet in length and 16 inches in diameter and 40 pounds in weight, and shall be securely tied by a material strong enough to support the weight of the bundle, or may be placed in plastic bags. The use of plastic bags for Yard Trash is discouraged by the County.~~

~~(4) Each individual Curbside Container filled with Solid Waste or Yard Trash shall not exceed 40 pounds in weight.~~

~~(5) The Customer shall place Solid Waste and Yard Trash in one or more Curbside Container(s). Yard Trash shall be placed in separate Curbside Containers from Solid Waste. Yard Trash placed in Curbside Containers shall not exceed four feet in height and shall be no more than 12 inches over the top of the Curbside Containers.~~

(6) Curbside Containers shall be placed at a point no farther than three feet from the nearest public or private way, or in the case of the existence of a drainage ditch, at a point within said dimensions adjacent to the nearest driveway, or as may be agreed between Franchisee and Customer.

(7) Curbside Containers shall not be placed at the curb earlier than 5:00 p.m. of the day prior to the designated Collection day. All emptied containers shall be returned to proper storage on the Premises no later than 10:00 a.m. on the day following the designated Collection day. Curbside Containers shall be stored between Collection days in side or rear yard and not the Front Yard. Public easements and rights-of-way are not to be used as a storage location for containers. Curbside Containers shall be stored within the perimeter of privately owned property.

(8) Franchisee will not be responsible for Unintentional Damage to or loss of Curbside Containers which exceed 40 pounds in weight when filled with Solid Waste or Yard Trash. If the Franchisee does not collect such containers due to excessive weight, the Franchisee shall tag the Curbside Containers, and shall notify the County within 24 hours of tagging said container. The tag shall clearly indicate the reason for the rejection, with information which will allow the Customer to correct the problem for future Collections.

(9) Recycling Containers and cardboard boxes shall not be used as containers for Solid Waste or Yard Trash.

(g) *Commercial Customers utilizing 90-gallon container Collection.*

(1) Customers using 90-gallon containers shall utilize such containers provided by the Franchisee.

(2) Ninety-gallon containers shall be constructed so as to prevent intrusion of water and the expulsion of its contents, with covers free from sharp edges or inside structures which will prevent the free discharge of its contents.

(3) Plastic, or other impervious bags, sufficient in strength for handling by the Franchisee may be utilized for Solid Waste and Yard Trash so long as they are closed and unbroken at the time of Collection.

(4) The Customer shall place Solid Waste and Yard Trash in one or more 90-gallon container(s). Yard Trash shall be placed in separate 90-gallon containers from Solid Waste. Yard Trash placed in 90-gallon containers shall be of a length that allows the lid to the 90-gallon container to remain closed.

(5) Ninety-gallon containers shall not be placed out for Collection earlier than 5:00 p.m. of the day prior to the designated Collection day. All emptied containers shall be returned to proper storage on the Premises no later than 10:00 a.m. on the day following the designated Collection day. Ninety-gallon containers shall be stored between Collection days in side or rear yard and not the Front Yard. Public easements and rights-of-way are not to be used as a storage location for containers. Ninety-gallon containers shall be stored within the perimeter of privately owned property.

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~~(6) Recycling Containers and cardboard boxes shall not be used as containers for Solid Waste or Yard Trash.~~

(~~eh~~) *Commercial Customers utilizing Commercial Container Collection.*

(1) Customers using Commercial Containers may arrange for their own container that will fit the Franchisee's equipment or one from the Franchisee.

(2) Commercial Container size and frequency of service must be sufficient to store and dispose of all waste generated within ~~one week~~ the time period required by Subsection 106-41(c).

(3) Commercial Containers and Commercial Recycling Containers or enclosed container areas shall be placed such that they are readily accessible to the Collection vehicle or an extra charge may be imposed with the approval of the Board.

(4) Commercial Containers and Commercial Recycling Containers shall be placed on a paved level surface; preferably a concrete pad six inches thick and all approaches to container shall be capable of supporting weight of Collection vehicle.

(5) Enclosures for Commercial Containers and Commercial Recycling Containers are required, unless there is a permanent storage area for such containers inside a walled and roofed building. Enclosures shall have the minimum internal dimensions of ~~the enclosure shall be~~ 12 feet wide by 12 feet deep ~~square,~~ and be of adequate size to contain all Collection Containers and Recycling Containers. Multiple enclosures may be constructed. Enclosures must be constructed to the current building code, and shall be equipped with gates, the clear opening dimension shall be 12 feet minimum, and gates must be equipped with an adequate means or device to hold them open. Enclosures with gates must have gate signs which read: NO PARKING. This sign shall not exceed two square feet in total area. Letters must be not less than three inches high and three-quarters inch wide. The sign must be in a contrasting color to the color of the enclosure.

(6) Commercial Container and Commercial Recycling Container location and approach shall be free of overhead wires, fuel tanks, fuel fill ports, or septic systems, low hanging branches or tree limbs. Locations shall be designated which maximize economy without sacrificing public health matters and convenience to the Customer. Locations shall be within the perimeter of privately owned property. Public easements and rights-of-way are not to be used as container location without prior written approval from the Executive Director.

(7) If the Commercial Container is inaccessible or blocked, service will be provided on the eCustomer's next regular pick up day unless a special pick up is arranged. Special pick up times can be arranged with the Franchisee at an additional Fee.

(8) Commercial Container and Commercial Recycling Container lids shall remain closed. Said containers shall not be overfilled such that lids cannot be securely closed. In the event said containers are overfilled and cannot be safely dumped, Customer will be notified by the Franchisee and service shall be rescheduled. The Franchisee shall also

notify the County to this effect. Special pickups for Commercial Containers can be arranged with the Franchisee at an additional charge.

(9) Commercial Containers and Commercial Recycling Containers shall have lettering not less than one and one-half inches high indicating the identification of the owner of the container.

(10) Commercial Customers desiring Supplemental Collection Service, such as special Collections of Bulk Waste shall arrange such Collection with the Franchisee for an additional fee, as described in Section 106-47(a)(3233).

(11) Each Customer is responsible to clean up debris around and in the vicinity of their Commercial Container and Commercial Recycling Container, and shall keep the container closed, the container clean, and the container accessible to Collection vehicles.

SECTION 20. Section 106-48 of the Code is hereby amended to read as follows:

Sec. 106-48. - Responsibilities of the County.

(a) The County shall provide resources, including personnel, equipment and facilities, to permit the County to fulfill its responsibilities for implementation of this Article ~~Ordinance~~ in accordance with existing County procedures. Organization, job descriptions and salary management for such County Personnel shall become an integral part of the County structure.

(b) The Franchisee shall permit the Executive Director to inspect the operations and equipment of the Franchisee at any reasonable time.

(c) The Executive Director shall evaluate the amount, quality, and character of the work performed by the respective Franchisee and shall make such explanations as are necessary to complete, explain, or clarify procedures and standards.

(d) The Executive Director shall decide all questions concerning quality and acceptability of work performed, manner of performance, rate of progress and interpretations and fulfillment of Solid Waste Management Department procedures and standards.

(e) The Executive Director shall investigate and resolve all disputes between a Customer and the Franchisee; including but not limited to, disputes over Rates or Fees for any and all services and disputes over location and condition of Collection points.

(f) The Executive Director shall develop a process for payment to the Franchisee which is consistent with existing procedures and standards. ~~Such distribution shall be on a monthly basis, for services performed during the previous month, in an amount of 1/12 of the approved annual payment per Customer. Payment shall be paid to the Franchisee within the first 15 working days of the following month.~~

(g) The Solid Waste Management Department shall maintain a list of newly issued Certificates of Occupancy and shall notify the Franchisee of the location of new units receiving a Certificate of Occupancy so that service can be initiated promptly.

(h) All Annual Assessments levied and collected herein shall be distributed to the Governing Body of the Solid Waste Service District(s) ~~who shall thereupon distribute to the Franchisee, on a monthly basis, for services performed during the previous month, an amount equal to 1/12 of the approved annual payment per Customer.~~; ~~plus~~ The Governing Body of the Solid Waste Service District(s) shall make adjustments for Customers added and Customers removed subsequent to the establishment of the approved annual payment per Customer and shall make corrections for errors or omission in the tax roll.

(~~i~~h) All Residential Waste shall be disposed of or processed at locations and in a manner as directed by the Board.

~~(i) The Clerk to the Board shall maintain all official records of the County and shall provide support to the Solid Waste Management regarding official records for the implementation of this Ordinance.~~

(j) The Executive Director is authorized to develop and maintain the Solid Waste Management Department procedures and standards, provided however, that the provisions of the Solid Waste Management Department procedures and standards do not violate local, state or federal laws.

(k) The Executive Director shall evaluate, clarify, and designate operational procedures, including but not limited to, classification, assessment, and Customer service, and shall make such explanations as are necessary to complete, explain, or clarify procedures and standards.

(l) The Solid Waste Management Department Director is authorized to start the administrative procedures to recommend the revocation of a Franchise if the Franchisee shall violate any of the conditions listed in the termination language of the Franchise Agreement, and shall not correct or remedy same within the time period specified in the termination language of the Franchise Agreement.

(m) Revocation proceedings recommended by the Executive Director may be commenced by the Board, in its legislative capacity, at any regular meeting, by the adoption of a resolution, specifying the grounds to be considered by the Board for revocation, and the date, time and place of a public hearing to be held thereon, which resolution shall be served upon the Franchisee not less than 20 calendar days prior to a public hearing thereon. The Board may, for good cause, enlarge the time.

(n) In all cases where the Board initiates any public hearing to enforce any provisions of a Franchise, and the Board finds at such public hearing that the provisions of a Franchise have been violated, the Franchisee shall pay all of the County's costs. Costs shall include, but are not limited to, the cost of any accountant and attorney's services (whether in house or external) necessary to determine compliance. All such costs shall be documented and billed to the Franchisee, and payment thereof shall be paid within 30 calendar days after billing.

(o) Public hearings under this Article ~~Ordinance~~, except revocation proceedings, may be conducted by the Board, under the procedure for public hearings established in this Article ~~Ordinance~~ and upon conclusion thereof the Board shall enter such orders as may be appropriate.

(p) Appeals from any Board resolution entered pursuant to this Article ~~Ordinance~~ shall be by certiorari to the Circuit Court in accordance with Florida Rules of Appellate Procedure.

(q) If a Franchisee fails or refuses to provide Collection of Residential Waste or Commercial Waste within the Solid Waste Service District(s), or if its Franchise is revoked, or if the Board or any other governmental agency acquires the assets of the Franchisee through condemnation proceedings, or purchases the assets of the Franchisee, the Board may apply to the Circuit Court for a receiver to perform the Franchisee's operations. The Board may perform the Franchisee's operations by itself; or the Board may cause the Franchisee's operations to be performed in any lawful manner as the public interest may require.

(r) The Board shall have the power to investigate the quality of service of the Franchisee, Franchisee's compliance with Sarasota County Ordinances, Collection routes, scheduling, plant or equipment, and all matters affecting the public welfare, and may hold hearings, and enter such orders as shall be necessary in the public interest.

SECTION 21. Section 106-49 of the Code is hereby amended to read as follows:

Sec. 106-49. - Rate regulation and adjustments.

(a) Rates and Fees for the Collection of Residential Waste and Commercial Waste as regulated by this Article ~~Ordinance~~ shall be established in accordance with the Rate provisions of the Franchise Agreement that has been approved by the Board.

(b) Proceedings to change Rates and Fees shall be conducted as described in the Franchise Agreement, including Annual Consumer Price Index (CPI) Adjustments, Pass-Through Adjustments, and Extraordinary Rate Adjustments.

SECTION 22. Section 106-50 of the Code is hereby amended to read as follows:

Sec. 106-50. - Complaints.

~~(a) The Solid Waste Management shall notify the Franchisee of complaints communicated to the County. Franchisee shall take whatever steps may be necessary to remedy the cause of the complaint and notify the Solid Waste Management of its disposition within 24 hours of receipt of the complaint. The Franchisee shall notify the County of the nature of all complaints by a Customer and their disposition on a daily or weekly basis, as requested by the County.~~

~~(b) Franchisee shall provide the Solid Waste Management with a full explanation of the disposition of any complaint involving a Residential Customer's claim of damage to private property as a result of actions of the Franchisee. Franchisee shall promptly repair any such legitimate damage claim at its sole expense and within a three-day period of time as approved by the Executive Director. Upon the request of the Franchisee, the Executive Director may grant a time extension. Proof of the need for an extension shall be submitted by the Franchisee.~~

~~(c)~~ Executive Director shall investigate all unresolved disputes between a Customer and the Franchisee, including, but not limited to, ~~for~~ any and all services and disputes over location and condition of Collection points. Executive Director shall make a final determination.

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~~(d) Franchisee shall maintain a database of all complaints received directly by the Franchisee and provide a report to the County on a daily or weekly basis as directed by the County. The Franchisee's database shall be compatible with County software. The daily or weekly report shall include the number of service calls, type of service call, address, and resolution of the complaint.~~

(be) The Executive Director shall notify the Franchisee or the Customer, as appropriate, in writing of deficiencies or default in performance or a dispute regarding implementation of this Article ~~Ordinance~~, or provisions of the Franchise Agreement, as follows:

(1) Franchisee or Customer has seven days, unless otherwise specified herein or if additional time has been granted by the Executive Director, to correct any deficiency or default.

(2) Reserved.

SECTION 23. Section 106-52 of the Code is hereby amended to read as follows:

Sec. 106-52. - Unauthorized removal of program recyclables.

No Person ~~person~~ other than the Franchisee may collect or cause to be collected any Program Recyclables from the Curbside or from any other authorized central location without having obtained prior approval from the Solid Waste Management Department. Unauthorized removal of Program Recyclables may be treated as a misdemeanor and is punishable as provided by general law.

SECTION 24. Section 106-53 of the Code is hereby amended to read as follows:

Sec. 106-53. - Amendments, additions or deletions to the list of recyclable materials.

(a) *State Requirements.* Materials which are required to be separated and offered for Recycling to meet the minimum Recycling program requirements of F.S. § 403.706, as may be amended, shall not be deleted from the definition and list of Recyclable Materials.

(b) *Deletions.* If Processing, shipping and incremental costs associated with Collection of a Recyclable Material exceed the sum of the price a Broker or End-User will pay for the Recyclable Material and the Landfill Disposal Cost, the Board may continue to include that material in the definition and list of Recyclable Materials for environmental or other reasons or delete that material by ordinance from the definition and list of Recyclable Materials after a waiting period of ~~18~~ 12 months.

(c) *Public Hearing Requirements.* In considering amendments to the definition and list of Recyclable Materials, the Board shall consider evidence and sworn testimony from any Person ~~person~~, including municipalities.

(d) *Implementation Schedules.* If a material is added or deleted from the list of Recyclable Materials, the ~~Board~~ Executive Director shall designate an implementation schedule including effective dates for separation, Collection, Processing and, if necessary, making a recommendation for a Rate revision.

SECTION 25. Section 106-54 of the Code is hereby amended to read as follows:

Sec. 106-54. - Unlawful disposal of solid waste.

(a) It shall be unlawful for any Person to discharge, throw, place, deposit or allow to remain in or upon any private or public Premises, road, rights of way, street, alley, canal, ditch, stream, lake, pond, bay or other waters, or any other public or private property, and Solid Waste or Recyclable Materials, except in and upon approved Solid Waste Disposal Sites, Recycling Facilities, or as otherwise authorized by this Article ~~Ordinance~~.

(b) It shall be unlawful for any Person not holding a valid Franchise or otherwise authorized by the Board of County Commissioners to engage in the performance of the following:

(1) Collection of Solid Waste from any source.

(2) Collection, hauling or transporting Residential Waste or Commercial Waste from or within the boundaries of the Solid Waste Service District(s), as provided for herein, by any Person other than a Franchisee ~~or Authorized Collector~~ for the Solid Waste Service District(s), except that Persons other than a Franchisee ~~or Authorized Collectors~~ may collect and haul within the Solid Waste Service District(s) the following: Land Clearing Debris; Construction and Demolition Debris, including debris generated by remodeling or demolition of building; trash and debris associated with farming operations involving five acres or more of land; Hazardous, Biological, Radiological and Biomedical Waste; wrecked, scrapped, ruined or dismantled motor vehicles, boats, or motor vehicle parts; Additional Recyclable Materials; and Commercial Customer Program Recyclables.

(3) Whether within or without the Solid Waste Service District(s), to dispose of or discard Solid Waste or Recyclable Materials at a place other than a Disposal Site or Recycling Facility established by law, or authorized by the Board. The temporary storage of such materials on the Premises where generated, pending disposition as authorized by law or ordinance, shall not be deemed a violation of this section. The accumulation of, or disposal and/or Processing of Solid Waste or Recyclable Materials in any place in the unincorporated areas of the County other than a site authorized by the Board for disposal or Processing of such materials shall be deemed a serious threat to the public health, safety and welfare.

(c) It shall be unlawful for any Person to place any Hazardous, Biological, Bio-Medical, or Radiological Waste in a Curbside Container, ~~90-gallon container,~~ Class II Container, Commercial Container or other container, which is utilized for the purpose of Collection by a Franchisee ~~or Authorized Collectors~~.

(d) It shall be unlawful for any Person, including a Franchisee ~~or Authorized Collectors~~, to haul or transport in the unincorporated areas of the County, any Waste Stream material, in and upon public roads in the County, unless the same shall be transported in a covered or enclosed vehicle or other device to prevent such waste from falling from, or blowing off, or in any way escaping from the vehicle or device.

(e) All provisions of the Florida Litter Law, F.S. § 403.413, as amended from time to time, shall be enforced by ~~the~~ Code Enforcement ~~officials of the Sarasota County Government~~.

SECTION 26. Section 106-55 of the Code is hereby amended to read as follows:

Sec. 106-55. - Certain unlawful acts of disposal of recyclable materials.

Notwithstanding any other provision of law to the contrary, it shall be unlawful and a violation of this Article ~~Ordinance~~ for any Person to knowingly combine Recyclable Materials with any other Solid Waste Stream ~~Nonconforming Material~~ in any combination or amount other than that approved by the County or to dispose of Recyclable Materials in any manner.

SECTION 27. Section 106-56 of the Code is hereby amended to read as follows:

Sec. 106-56. - Prohibition of incineration of recyclable materials.

(a) Recyclable Materials shall not be burned or incinerated in Sarasota County, except that ~~Clean Wood Waste and Yard Trash~~ where Recyclable Materials may be used as an additive to create energy and burned or incinerated in a power-generating plant, as specified in F.S. § 403.706~~(4)(b)2~~, as amended from time to time, which has been permitted by the Florida Department of Environmental Protection and which meets all federal, State and local laws, rules and regulations.

(b) Land Clearing Debris, including branches and trees, may be burned or incinerated in accordance with State and local permits. However, Land Clearing Debris from a parcel of land containing two or less contiguous acres under unified ownership shall be recycled.

(c) Prescribed Burning or agricultural or silvicultural fires for the growing, raising, or harvesting of cleared or in-place crops or timber may be permitted in accordance with State and local permitting requirements.

SECTION 28. Section 106-57 of the Code is hereby amended to read as follows:

Sec. 106-57. - Termination of franchise.

(a) Upon termination of a Franchise Agreement for any reason, including expiration of the Franchise Agreement term, the Board may, at its discretion:

(1) Renew the Franchise Agreement upon amended or existing terms with the current Franchisee; or

(2) Grant a Franchise Agreement to a Person other than the Franchisee currently providing Collection Services in the Solid Waste Service District(s); or

(3) Solicit proposals through a County approved procurement process for the Collection Services within the Solid Waste Service District(s).

(b) No later than 18 months prior to the expiration of a Franchise Agreement, the Board shall determine whether to renew the Franchise Agreement or to solicit for Collection Services within the Solid Waste Service District(s).

(c) If the Board determines to solicit for Collection Services, staff shall issue procurement documents no later than 12 months prior to the expiration of the Franchise Agreement.

(d) In the case of termination of a Franchise Agreement for cause, the Board may take whatever action it deems appropriate to ensure the continued performance of Collection Services in the Solid Waste Service District(s).

SECTION 29. Section 106-58 of the Code is hereby amended to read as follows:

Sec. 106-58. - Miscellaneous provisions.

(a) The Executive Director or designee shall administer this Article ~~Ordinance~~ and, ~~in~~ on behalf of the Governing Body of the Solid Waste Service District(s), shall be the ex-officio chief executive officer of the Solid Waste Service District(s). He shall keep records of all expenses incurred on behalf of the Solid Waste Service District(s) and charge all such expenses to the Solid Waste Service District(s).

(b) The Board reserves the right to regulate, collect and dispose or process Residential Waste and Commercial Waste in all or any part of the unincorporated areas of the County, whether within the Solid Waste Service District(s) or not, and to adopt rules, regulations and Rates therefore.

(c) The owner and/or occupant of any Premises located in the unincorporated area of the County, except authorized Disposal Sites, shall maintain the Premises free from all Solid Waste not properly stored as required by this Article ~~Ordinance~~, or rules promulgated hereunder whether generated or accumulated from on or off the Premises.

(d) The owner and/or occupant of any Premises located in the unincorporated area of the County, except properly permitted and authorized Recycling Facilities, shall maintain the Premises free from an accumulation of Recyclable Materials not properly stored as required by this Article ~~Ordinance~~, or rules promulgated hereunder whether generated or accumulated from on or off the Premises.

(e) Notwithstanding any provisions of this Article ~~Ordinance~~ to the contrary, it shall not be deemed a violation of this Article ~~Ordinance~~ for any Person engaged in the business of lawn care and maintenance, as defined herein, to collect and transport the Yard Trash generated by such business at ~~his~~ its cost provided the hauling of the said Yard Trash is performed in accordance with this Article ~~Ordinance~~, and other applicable ordinances or laws.

(f) Hazardous, Radiological, Biological and Biomedical Waste shall be handled, stored, transported, and disposed of in the manner prescribed by law. Any Person in possession of such waste may contact the Solid Waste Management Department for information relating to the handling, storage, transporting and disposal thereof.

(g) The Board may authorize the disposal and processing of Solid Waste using any method not prohibited by law, including, but not limited to, Landfills, resource recovery, or otherwise. It shall be unlawful for any Person to build, or operate a Solid Waste Disposal Site or other system in the unincorporated area of Sarasota County without first having applied for and received authority from the Board.

(h) The Board is authorized to adopt by resolution, after a public hearing, ~~fees~~ Fees and charges for the use of County Solid Waste Disposal Site(s), including charges for the entry of vehicles into said Solid Waste Disposal Site(s), which Fees and charges shall be paid by all Persons prior to the use of said facilities. Fees and charges may include funds required for the operations and expansion of facilities. The adoption of resolutions for Annual Assessments shall take place prior to or at the time of the adoption of Fees and charges for the use of the County Solid Waste Disposal Site(s).

(i) No Franchise issued heretofore, or hereafter, for Collection Services shall be, or represent any monetary value, insofar as the County is concerned, and the issuance hereof shall not constitute a bar to the acquisition by the County by lawful means.

(j) In the event more than one Franchisee is authorized to perform Collection Services within the Solid Waste Service District(s), it shall be unlawful for any Franchisee to engage in Collection Services from any other Franchisee's designated franchise area, except that the Board, upon recommendation by the Executive Director and with joint application of affected Franchisee and for good cause shown, may authorize Franchisee from one franchise area to perform Collection Services in another franchise area; except that nothing in this subsection shall modify or change any established Rates or Fees.

(k) The Board is hereby authorized and empowered to offer and pay rewards from the Fine and Forfeiture Fund for information leading to the arrest and conviction of any Person violating this Article ~~Ordinance~~. That the amount of any reward payable hereunder shall not be less than $10.00 or greater than 50 percent of any fine imposed by any court, whichever amount may be greater.

(l) The Board is hereby authorized to appropriate and expend monies out of the Fine and Forfeiture Fund of the County for the purposes provided in this Article ~~Ordinance~~ and the appropriation and expenditure of monies for said purposes are hereby declared to be for lawful County purposes.

(m) All governmental agencies shall be required to utilize the mandatory Solid Waste Collection and disposal system for property located within the Solid Waste Service District(s). All Improved Real Property owned by any governmental agency shall be classified as commercial Premises for the purpose of this Article ~~Ordinance~~.

(n) The Board may, in the event excessive amounts of debris have accumulated by reason of any hurricane, flood, tropical storm, freeze, natural disaster, severe disturbance, riot or other calamity, whether or not classified as Disaster Debris pursuant to the provisions of this Article ~~Ordinance~~, require the Franchisee to remove and dispose of the excess debris within the Solid Waste Service District(s) at Rates to be adopted by the Board. Should the eCounty wish to utilize the Franchisee to perform such work, the Board shall direct the Franchisee to perform such work

at the specified rate, and shall take into account the Franchisee's primary Collection obligations and the availability of equipment. However, nothing herein shall require the County to utilize the services of Franchisee, or to prevent the County from contracting with other parties to perform all or a portion of such work. The County reserves the right to utilize County ~~P~~personnel and equipment in the removal of Disaster Debris of any kind.

(o) The Executive Director ~~Board~~ may establish and adopt~~, after a public hearing,~~ such policies and procedures relating to the transport, disposal, management, storage, and Collection of Solid Waste and Recyclable Materials in the unincorporated area of Sarasota County, whether within the Solid Waste Service District(s) or not, as shall be necessary to fully implement the provisions of this Article ~~Ordinance~~, which shall be enforced in the same manner as provisions of this Article ~~Ordinance~~. Any violation of the ~~P~~policies and ~~P~~procedures established under this Article ~~Ordinance~~ shall be deemed a violation of this Article ~~Ordinance~~.

(p) The accumulation of Solid Waste, Recyclable Materials, or Yard Trash, including, but not limited to, Construction and Demolition Debris which is not properly contained as delineated in Section 106-58(q) below, trash, E-Waste ~~Computers and Electronic Equipment~~, Garbage, Hazardous Waste, Biological Waste, Biomedical Waste, Radiological Waste, wrecked or scrapped motor vehicles and boats, or the accumulation of discarded items of any kind for more than seven calendar days, except as authorized by law or this Article ~~Ordinance~~, shall be deemed a public nuisance, injurious to health, and a violation of this Article ~~Ordinance~~, and otherwise actionable as provided by law.

(q) Sarasota County Planning and Development Services ~~Construction and Property Standards~~ is authorized and directed to issue stop work orders on any construction project at which Construction and Demolition Debris is accumulated for more than seven calendar days. It shall not be an offense under this subsection if the Construction and Demolition Debris is stored on the site in containers designed and maintained for the Collection and removal of Construction and Demolition Debris.

(r) This Article ~~Ordinance~~, and any resolution, rule or regulation adopted pursuant thereto shall supersede and take the place of all ordinances, resolutions, rules and regulations heretofore enacted in conflict herewith, and shall be applicable to any Franchise in existence on the effective date hereof, except that no such existing Franchises shall be canceled, nor the term thereof modified except as provided by law. Notwithstanding the foregoing, any violation of an existing Franchise occurring prior to the adoption of this Ordinance may be enforced under the provisions of ordinances repealed by this Article ~~Ordinance~~ as if no repeal occurred.

(s) The Board shall maintain or authorize Solid Waste Disposal Site(s) and adopt rules and regulations governing the operation and conduct thereof. In adopting such rules, the Board shall consider the rules and regulations it has adopted governing the mandatory Collection of Solid Waste throughout the unincorporated areas of Sarasota County.

(t) All County Business Centers shall comply with the provisions of this Article ~~Ordinance~~. All County Business Centers providing Solid Waste receptacles for the public's use shall also provide clearly labeled Recycling Containers for use by the public and by employees of Sarasota County. In addition to signs on the Recycling Containers, signage for walls may be required.

SECTION 30. Section 106-59 of the Code is hereby amended to read as follows:

Sec. 106-59. - Biological, biomedical, hazardous and radiological wastes.

(a) Biological, Hazardous, Bio-Medical, and Radiological Waste shall be stored, transported, and disposed of in accordance with all Federal, State, and Local Laws.

(b) It shall be a violation of this Article ~~Ordinance~~ for any Residential or Commercial Customer to combine Biological Waste, Hazardous Waste, Biomedical Waste, and Radiological Waste, including E-Waste ~~Computers and Electronic Equipment~~ and used oil, with any Solid Waste, or other Recyclable Materials for Collection.

(c) The Executive Director ~~or designee,~~ shall have the authority to inspect the waste being deposited by Customers, at any time, to determine whether such material contains Biological, Hazardous, Radiological or Biomedical Waste, and to take whatever action he deems necessary to ensure ~~insure~~ that the Customer ceases placement of such waste into the Sarasota County Solid Waste Disposal System or the Sarasota County Mandatory Recycling Program.

(d) The Franchisee shall refuse to collect Residential Waste or Commercial Waste from a Customer if the Franchisee believes that such materials contain Biological, Hazardous, Radiological or Biomedical Waste. If the Franchisee believes a Customer is depositing such waste for Collection, the Franchisee shall immediately notify the Executive Director, or designee.

SECTION 31. Section 106-60 of the Code is hereby amended to read as follows:

Sec. 106-60. - Enforcement and penalties.

(a) The enforcement of this Article ~~Ordinance~~ shall be done through Code Enforcement ~~Officials of Sarasota County Government~~, and any other legal means available.

(b) The Executive Director and/or Code Enforcement Officers are authorized to inspect any Recycling or disposal container, bag, can, or other container utilized for the Collection, containment, storage, removal and transport of Solid Waste, Yard Trash, or C&D Debris and/or Recyclable Materials. Code Enforcement Officers are also authorized to inspect loose materials, any activities related to Collection, disposal, Processing, Recycling, waste reduction, burning, volume reduction, Mulching, Composting, or any Recycling or disposal facility, at any time, for compliance with this Article ~~Ordinance~~.

(1) Code Enforcement Officers are authorized to strictly enforce all provisions of this Article ~~Ordinance~~ pursuant to relevant provisions herein.

(2) A Code Enforcement Officer shall issue a citation to a Person when, based upon personal investigation, the Code Enforcement Officer has reasonable cause to believe that the Person has committed a civil infraction in violation of this Article ~~Ordinance~~. Prior to issuing a citation, the Code Enforcement Officer shall issue a written warning to the violator.

(3) If, upon personal investigation, the Code Enforcement Officer finds that the Person has not corrected the violation within the time specified in the written warning, or that a second offense has occurred, the Code Enforcement Officer shall issue a citation to the Person who has committed the violation indicating the amount of the civil penalty and notice of the right to contest the citation in County court within 30 days.

(4) If the Person elects not to contest the citation, the applicable civil penalty shall be paid to the Clerk ~~of the County Court~~ within 30 calendar days after issuance.

(5) If the Person elects to contest the Citation, he/she shall request a hearing through the Clerk ~~of the County Court~~ within 30 calendar days after issuance of the citation. The Clerk shall schedule a hearing in the County court and shall provide written notice of the hearing to the Person and the Code Enforcement Officer. Citations contested in the County Court shall be subject to court costs and civil penalty not to exceed $500.00.

(6) If the Person fails to pay the civil penalty within the time allowed, or fails to appear in court to contest the citation, he/she shall be deemed to have waived his/her right to contest the citation and, in such case, judgment may be entered against the Person for an amount up to the maximum civil penalty. Additionally, the court may issue an order to show cause upon the request of the County requiring such Person to appear before the court to explain why action on the citation has not been taken. The court may hold in contempt any Person who is issued such order and fails to appear in response to the court's directive.

(7) Any Person who willfully refuses to sign and accept a citation issued by a Code Enforcement Officer shall be punished as if guilty of a misdemeanor of the second degree.

(c) A violation of this Article ~~Ordinance~~ is a civil infraction.

(d) The property owner, tenant of any building, structure, or part thereof, agent, Hauler, or other Person who commits, participates in, assists in, or maintains a violation shall be held jointly and severally liable for applicable penalties accessed as stated herein.

(e) The penalty for Residential Customers (Class I and Class II) for a civil infraction is as follows:

(1) First offense - written warning issued with seven calendar days to comply

(2) Second offense - $200.00

(3) Third offense - $300.00

(4) Fourth or subsequent offense - $500.00

(f) The penalty for Commercial Customers for a civil infraction is as follows:

(1) First offense - written warning issued with seven calendar days to comply

(2) Second offense - $200.00

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(3) Third offense - $300.00

(4) Fourth or subsequent offense - $500.00

(g) The penalty for all Haulers, other than the Franchisee, for a civil infraction is as follows:

(1) First offense - written warning issued with seven calendar days to comply

(2) Second offense - $250.00

(3) Third offense - $350.00

(4) Fourth or subsequent offense - $500

(h) Increased penalties apply only when the same Article ~~ordinance~~ provision is violated and within five years of the previous offense.

(i) Each day a violation continues shall be considered a separate offense.

(j) All civil penalties shall be deposited into the Solid Waste Enterprise Fund.

~~(k) Subject to Section 106-60(1) herein, following notification by the Executive Director, failure by the Franchisee to remedy the cause of any Legitimate Complaint within the time indicated, or any performance failures shall result in the Executive Director imposing penalties. Factors to be considered when assessing penalties include, but are not limited to, acts of nature, repeated occurrences of similar types, and documentation of the incident.~~

~~(1) Penalties are as set forth below:~~

~~a. *Spillage and litter.* Failure to clean up spilled material from loading and/or transporting in compliance with the "Florida Litter Law" as described in the Franchise Agreement. Each failure shall result in the imposition of a $250.00 penalty.~~

~~b. *Collection misses.* Failure or neglect to collect properly prepared Solid Waste or Yard Trash or properly prepared Program Recyclables from any Premises at those times provided by the Franchise Agreement within 24 hours of the day of notification. Each failure shall result in the imposition of a $100.00 penalty. Each additional 24 hours of failure to collect after previous notification shall result in the imposition of a $250.00 penalty.~~

~~c. *Chronic complaint problems.* Failure or neglect to correct chronic problems (chronic shall mean three or more similar Legitimate Complaints at the same Premises within a 12 month period) in any category of service shall result in the imposition of a $250.00 penalty for each occurrence after the second. The Franchisee being penalized for more than five chronic complaint problems within a month shall result in the imposition of an additional $500.00 penalty.~~

d. *Street completion.* Failure or neglect to complete each street on a route including missing whole or partial on the regular scheduled Collection day or within 24 hours of the day of notification shall result in the imposition of a $500.00/street/day penalty for each instance as determined by the County.

e. *Mixing materials.* Intentionally mixing Yard Trash, Program Recyclables, Solid Waste, Computers and Electronic Equipment, used oil, or any other materials intended to be collected separately, during Collection shall result in the imposition of a $1,000.00 penalty for each instance.

f. *Mixing program recyclables.* Mixing Dual Stream Recycling Container Program Recyclables and Paper Program Recyclables during Collection or tipping at the Designated RMPF or any sub-facility or transfer station shall result in the imposition of a $1,000.00 penalty for each occurrence.

g. *Mixing commercial and residential program recyclables.* Mixing Commercial Program Recyclables and Residential Program Recyclables during Collection or tipping at the Designated RMPF or any sub-facility or transfer station shall result in the imposition of $1,000.00 penalty for each occurrence, unless prior approval for the mixing has been granted by the Executive Director.

h. *Collection of improperly prepared program recyclables and nonprogram recyclables or nonconforming materials.* Based on monthly reports from the Designated RMPF, Franchisee shall be responsible for all transportation and disposal costs associated with delivering rejects in excess of two percent of the gross tons of Program Recyclables delivered to the Designated RMPF by the Franchisee, as described in the Franchise Agreement.

i. *Failure to provide route sheets.* Failure of the driver of a Franchisee vehicle to provide the Executive Director or operator of a Designated RMPF or operator of a Designated Disposal Site with a copy of the daily route sheet for that day upon the request of said operator or Executive Director shall result in the imposition of a $100.00 penalty for each occurrence.

j. *Complaints other than collection misses.* Failure to resolve Legitimate Complaints other than collection misses within seven business days of the day of notification or as specified in the Franchisee Agreement shall result in the imposition of a $250.00/day penalty for each occurrence until complaint is resolved to the satisfaction of the County.

k. *Failure to report.* Failure to timely file any report required herein or as specified in the Franchise Agreement shall result in the imposition of a $100.00 penalty for each day that each report is late.

l. *Disposing at nondesignated disposal sites.* Failure to dispose of Residential Waste or Commercial Waste collected in the Service Area at a Designated Disposal Site shall result in the imposition of a penalty equal to the current tip fee at the Designated Site plus 25 percent, per ton disposed at nondesignated Disposal Sites.

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~~m. *Chronic equipment problems.* Failure or neglect to correct chronic equipment problems (chronic shall mean three or more instances of the same or similar problem with the same equipment/trucks within a 12-month period) shall result in the imposition of a $250.00 penalty for each occurrence after the second.~~

~~n. *Failure to properly label containers.* Failure to properly and legibly label Recycling Containers, Commercial Containers and/or Roll Carts to identify appropriate materials to be placed in such containers (e.g. Solid Waste, Yard Trash, Corrugated Cardboard, etc.) shall result in the imposition of a $100.00 penalty for each container not properly labeled.~~

(k~~l~~) *Legitimate Complaints and performance provisions shall be as set forth by the Franchise Agreement.* Based upon an investigation, the Executive Director shall determine whether penalties shall be assessed against the Franchisee for failure to comply with the Legitimate Complaints or performance provisions, as set forth by the Franchise Agreement ~~described in Section 106-60(k)~~.

(1~~2~~) Prior to assessing penalties, the Executive Director shall provide written notice to the Franchisee, indicating the County's intent to assess penalties.

(2~~3~~) The Franchisee shall have ten days from the date of the written notice to file a written letter of protest with the Executive Director.

(3~~4~~) If protest is timely filed, the matter shall be referred to a Code Enforcement Special Master pursuant to Chapter 2, Article VIII of the Sarasota County Code. The Executive Director's written notice shall be treated as a Notice of Violation for purposes of invoking Special Master Jurisdiction.

(4~~5~~) If the protest is not timely filed, the Executive Director shall deduct the amount of the penalty from payment due or to become due to the Franchisee.

SECTION 33. SEVERABILITY.

The provisions of this Ordinance are severable, and it is the legislative intention to confer upon the whole or any part of the Ordinance the powers herein provided. If any of the provisions of this Ordinance shall be held unconstitutional by any court of competent jurisdiction, the decision of such court shall not affect or impair any remaining provisions of the Ordinance. It is hereby declared to be the legislative intent that this Ordinance would have been adopted had such unconstitutional provision not been included herein.

SECTION 34. EFFECTIVE DATE.

This Ordinance shall take effect immediately upon filing with the Florida Department of State.

PASSED AND DULY ADOPTED by the Board of County Commissioners of Sarasota County, Florida, this 15th day of November, 2022.

BOARD OF COUNTY COMMISSIONERS OF SARASOTA COUNTY, FLORIDA

By: _____
Chairman

ATTEST:

KAREN E. RUSHING, Clerk of the Circuit Court and Ex-Officio Clerk of the Board of County Commissioners of Sarasota County, Florida

By: Maria Bocci
Deputy Clerk

02022-069

Appendix P

Task 17 White Paper – Waste-to-Energy Health Impacts Publications Resources

Solid Waste Authority of Broward County, Florida

White Paper: Waste-to-Energy Health Impacts Publication Resources

Solid Waste Authority of Broward County
115 South Andrews Avenue, Room 122
Fort Lauderdale, FL 33301
786-626-1217

SCS ENGINEERS

09224106.00, Task 00017 | April 28, 2025

6115 Lyons Road
Coconut Creek, FL 33073
954-354-0664

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1 INTRODUCTION

As requested by the Solid Waste Authority of Broward County (Broward SWA), this Waste-to- Energy Health Impacts Publication Resources White Paper (White Paper) was prepared to provide a consolidated reference guide of published resources, reports, and studies regarding the health impacts of Municipal Solid Waste (MSW) Waste-to-Energy (WtE) facilities. For ease of reference, a URL is provided for each document along with a content preview.

The guiding principle of this assignment was to identify and present documents from authoritative bodies such as government agencies like the United States Environmental Protection Agency (USEPA); quasi-governmental agencies like the World Health Organization and the US National Academy of Sciences; industry trade groups like the International Solid Waste Association (ISWA); and public interest groups such as the Environmental Defense Fund (EDF). Additionally, as this topic is not unique to the Broward SWA, it should be noted that, from a regional perspective, several other local jurisdictions (e.g., City of Miramar, Solid Waste Authority of Palm Beach County, and Miami-Dade County) provide reference materials on their respective websites and continued regional collaboration could be beneficial.

The focus of this assignment was to identify and present documents that provide information about the health risks associated with MSW WtE facilities only; this paper does not address combustors of hazardous waste, industrial waste, or other waste such as used oil or spent solvents. Many white papers and position papers from various groups and associations provide conclusions about the health impacts of WtE facilities but present limited to no scientific data or citations to peer-reviewed published literature to support their claims; those documents were excluded from this White Paper. Only documents that provide a supporting scientific rationale for their conclusions are included in this White Paper.

This White Paper also excludes newspaper articles and webpages. In some cases, the webpages of interest groups were consulted in order to identify documents that might meet the inclusion criteria. However, statements made by interest groups or private citizens at public meetings or during litigation or submitted during public comments on proposed regulations or proposed facility operating permits are excluded.

Lastly, it is the intent of this White Paper to provide a review of the primary epidemiology literature and a search specifically for review articles that provide a summary or peer review of the vast literature on WtE epidemiology studies. Several peer-reviewed publications that review the primary epidemiology literature were identified and reviewed for suitability but were rejected for inclusion in the White Paper because they did not address modern WtE facilities. Most of these publications provide studies of waste incinerators that combust many different types of waste, while many others are dated and thus irrelevant to the impacts, if any, from modern WtE facilities due to technological advancements.

The documents listed below are not summarized or critically evaluated beyond confirming their consistency with the inclusion criteria as such evaluations are beyond the scope of this task. However, each item listed includes a direct quotation of summary text from that document (i.e., a preview). This White Paper is not intended to be exhaustive; rather, it includes relevant documents that were identified in the time allotted and that meet the above inclusion criteria.

The reference documents are organized by the following sources: International Organizations, Governmental Agencies, and Interest Groups/Trade Groups. The final section discusses the primary epidemiological literature and provides an overview of the current state of the science.

2 INTERNATIONAL ORGANIZATIONS

This section presents resources from specialized agencies within the United Nations, such as the World Health Organization.

1. **World Health Organization, 2023. Assessing the health impacts of waste management in the context of the circular economy [CE]. In Assessing the health impacts of waste management in the context of the circular economy.** https://iris.who.int/handle/10665/366667

   Preview: "The literature review found evidence of the benefits of moving away from purely landfill disposal, to increasing materials recovery and energy recovery. Such a transition supports both a transition to a CE and reduced population health risks."

   "The scientific literature on waste incineration distinguishes between different technologies. These are variously described as either being more modern, that is third-generation, or being less sophisticated, that is first- and second-generation. Proprietary technologies vary, but the main differences relate to the selectivity of the input waste streams, the combustion process, use of abatement technologies and other design features, such as stack height, that reduce concentrations of any hazardous emissions. For modern, well-designed and operated third-generation facilities, none of the four systematic reviews relating to health impacts of waste incineration analysed identified any statistically significant health risks (de Titto & Savino, 2019; Cole-Hunter et al., 2020; Negri et al., 2020; Tait et al., 2020)."

2. **United Nations Environment Programme and Climate and Clean Air Coalition.** 2021. Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions. Nairobi: United Nations Environment Programme. https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions

   Preview: "Targeted Measures (Waste Sector): Solid waste management: (residential) source separation with recycling/reuse; no landfill of organic waste; treatment with energy recovery or collection and flaring of landfill gas; (industrial) recycling or treatment with energy recovery; no landfill of organic waste."

3. **United Nations Environment Programme (UNEP). 2019. Waste to Energy: Considerations for Informed Decision-making. Summary for Policymakers.** https://www.unep.org/ietc/resources/publication/waste-energy-considerations-informed-decision-making

   Preview: "PUBLIC HEALTH AND ENVIRONMENTAL CONCERNS: A shift to thermal WtE could improve hygiene and environmental conditions."

   "There have been significant improvements in emissions control for modern thermal WtE technologies compared to WtE technologies from the 1970s to the 1990s. Thermal WtE plants with advanced emission control technologies that are well-maintained have minimum public health impacts. Nevertheless, mismanaged thermal WtE plants have been shown to produce unsafe emissions, despite advanced emission control technologies."

4. **World Health Organization, 2015. Waste and human health: evidence and needs:** WHO meeting report 5–6 November 2015: Bonn, Germany. In Waste and human health: evidence and needs: WHO meeting report 5–6 November 2015: Bonn, Germany. https://iris.who.int/handle/10665/354227

   Preview: "As stated above, emissions from incinerators have been much changing over time. This entails changing health impacts, and it is difficult to formulate overall considerations on the health effects. Available evidence is therefore specific to the period of investigation and to the different types of incinerator analysed (old generation versus new generation plants). On the other hand, the improvement in exposure assessment methods mentioned above can help summarize the health risks. Papers dealing with the health effects of incinerators active in the years 1969–1996 consistently report a detectable risk of some cancers in the populations living nearby, through high quality studies, as reported in different reviews. Quantitative estimates of excess risks of specific cancers in populations living near solid waste incinerator plants were provided (Elliott et al.,1996) for all cancers, stomach, colon, liver, and lung cancer. Other studies performed in Italy, France and the United Kingdom indicate some suggestive but not consistent results for nonHodgkin lymphomas and soft tissue sarcomas (Elliott et al., 1996; Viel et al., 2000, 2008; Comba et al., 2003; Floret et al., 2004; Zambon et al., 2007; Ranzi et al., 2011). The majority of these studies concerned old generation incinerators, characterized by high emission levels. The emissions of modern incinerators which have been investigated are different in quantity and composition, as a result of modern abatements techniques. For this reason the results of all available studies cannot be compared, and consistency across studies is not expected."

   Note: *the SCS Team has reviewed many of the above-cited studies and found that many of them were not specific to MSW combustors; they included combustion of industrial waste, hazardous waste, medical waste, sewage sludge, solvents, oil, etc. as well as emissions from local heavy industries*.

3 GOVERNMENT AGENCIES

This section presents resources from government agencies from the United States, Canada, Germany, United Kingdom, and the European Union.

1. **European Environment Agency. 2025. Methane, climate change and air quality in Europe: exploring the connections.** https://www.eea.europa.eu/en/analysis/publications/methane-climate-change-and-air-quality-in-europe-exploring-the-connections

   Preview: "Since 1990, methane emissions from solid waste disposal and wastewater treatment have decreased due to the increased separate collection, recycling, and pre-treatment of waste, and by diverting waste to biological treatment and waste energy recovery. Methane emissions are reduced further through improved landfill gas capture and recovery."

2. **U.S. EPA. 2024. Energy Recovery from the Combustion of Municipal Solid Waste (MSW)** https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw

   Preview: "Energy recovery from the combustion of municipal solid waste is a key part of the non-hazardous waste management hierarchy, which ranks various management strategies from most to least environmentally preferred. Energy recovery ranks below source reduction and recycling/reuse but above treatment and disposal. Confined and controlled burning,

known as combustion, can not only decrease the volume of solid waste destined for landfills, but can also recover energy from the waste burning process. This generates an energy source and reduces carbon emissions by offsetting the need for energy from fossil sources and reduces methane generation from landfills."

3. **Greater London Authority (GLA). 2020. Marner, Dr. B., Richardson, T., and Laxen, Prof. D. Health Effects due to Emissions from Energy from Waste Plant in London.** Air Quality Consultants, Ltd. Prepared for GLA. And Institute of Occupational Medicine (IOM). 2019. Health Impacts associated with Energy-from-Waste Incinerators. Literature Review. Report 144 / August 2019. https://cdn.ca.emap.com/wp-content/uploads/sites/6/2020/10/Health-Effects-due-to-Emissions-from-Energy-from-Waste-Plant-in-London.pdf.

   Preview: "This report, commissioned by the Greater London Authority, reviews the recently published (i.e. in the last five years) scientific literature to identify any potential direct impacts of modern MSWIs on human health in the community that would be relevant to London, UK. The literature searches identified 35 relevant studies published in the last 5 years, which have mainly focused on levels of pollutants, such as dioxins and metals, emitted from incinerators, and the assessment of related population exposure and health risks.

   The reviewed evidence suggests that well-managed modern MSWIs are unlikely to pose a significant health risk (i.e. cancer, non-cancer, pregnancy, birth and neonatal health) in the UK under the current stringent regulatory regime.

   Recent epidemiological studies (i.e. population based) have not found consistent evidence of health effects associated with modern MSWIs. However, risk assessment studies (i.e. based on mathematical calculations) have in some cases, mainly in China, estimated cancer risks that exceed recommended ranges. The comparability of the plants included in these studies with modern MSWIs currently operating in the UK is unclear. Recent epidemiological studies did not find evidence of an association between MSWIs in Great Britain and infant mortality, adverse pregnancy, birth or neonatal outcomes. However, one of these studies found small excess risks associated with congenital heart defects and genital anomalies in proximity to MSWIs. These latest findings may reflect incomplete control for confounding, but a possible causal effect could not be excluded.

   Earlier studies did not find convincing evidence of an association of proximity to older incinerators in Great Britain with cancer. Although there is limited evidence of an association of proximity to older incinerators, or exposure to dioxins, with sarcoma and lymphoma risk in other countries, the very substantial decrease in dioxin emissions from MSWIs over recent years is likely to make these risks negligible for populations currently living in the vicinity of modern, well-controlled plants in the UK. It is important to point out that stack emissions from modern MSWIs are much reduced compared to old generation plants.

   On the basis of this review, we conclude that any potential health risks associated with direct emissions from modern, effectively managed and regulated MSWIs in London are exceedingly low. However, consideration should be given to secondary pollutant formation (e.g. fine particles formed in the atmosphere from gaseous emissions from MSWIs), as well as to emissions from additional heavy-duty road traffic in the vicinity of the plants."

4. **Public Health England. 2019. Guidance: PHE statement on modern municipal waste incinerators (MWIs) study. Updated 15 October 2019.** https://www.gov.uk/government/publications/municipal-waste-incinerators-emissions-impact-on-health/phe-statement-on-modern-municipal-waste-incinerators-mwi-study#:~:text=Guidance,15%20October%202019

   Preview: "The results of a major study on modern municipal waste incinerators (MWIs) have been published by the Small Area Health Statistics Unit (SAHSU) at Imperial College London. / The 2 papers - published respectively in November 2018 and May 2019 - found no evidence of an increased risk of infant mortality for children living close to MWIs. / A final paper, published in June 2019, found no evidence of increased risk of congenital anomalies from exposure to MWI chimney emissions, but a small potential increase in risk of congenital anomalies for children born within ten kilometres of MWIs. / The SAHSU authors acknowledge the increase in risk of congenital anomalies linked to distance from MWIs is the cruder of the two measures and may well be down to not fully adjusting the study for factors such as other sources of pollution around MWIs or deprivation. / A causal association between the increased risk of congenital anomalies for children born close to MWIs has not been established. / PHE's risk assessment remains that modern, well run and regulated municipal waste incinerators are not a significant risk to public health. While it is not possible to rule out adverse health effects from these incinerators completely, any potential effect for people living close by is likely to be very small. / This view is based on detailed assessments of the effects of air pollutants on health and on the fact that these incinerators make only a very small contribution to local concentrations of air pollutants. / PHE will continue to review its advice in light of new substantial research on the health effects of incinerators published in peer-reviewed journals."

5. **Joint Institute for Strategic Energy Analysis (U.S. Department of Energy's National Renewable Energy Laboratory). 2013. Analyzing the Economic and Environmental Viability of Waste-to-Energy (WTE) Technology for Site-Specific Optimization of Renewable Energy Options. NREL/TP-6A50-52829**. https://www.nrel.gov/docs/fy13osti/52829.pdf

   Preview: "We find that MSW combustion is a better alternative than landfill disposal in terms of net energy impacts and carbon dioxide (CO2)-equivalent GHG emissions. In this report, WTE leads to greater GHG reductions per kWh of electricity generated compared to landfill gas-to-energy."

6. **Department for Environment Food and Rural Affairs (DEFRA). 2013. Incineration of Municipal Solid Waste.** https://assets.publishing.service.gov.uk/media/5a7c909ced915d48c24109e5/pb13889-incineration-municipal-waste.pdf.

   Preview: Re-cites the conclusion from HPA (2009). (see below)

7. **California Department of Resources Recycling and Recovery (CalRecycle). 2012. Walker, S. and W, Gin. CalRecycle Review of Waste-to-Energy and Avoided Landfill Methane Emissions.** https://pw.lacounty.gov/epd/conversiontechnology/download/CalRecycle_Review_of_WtE_Avoided_Emissions_07032012.pdf

   Preview: "Diverting solid waste to a Waste-To-Energy (WtE) facility or a diversion facility such as a composting operation or anaerobic digester avoids the methane that would have been generated if the waste were sent to a landfill. Landfills are complex sources of methane

emissions that occur over decades to centuries from the date of disposal in the landfill. Research and technology on landfill methane emissions and controls is rapidly advancing; however, given the heterogeneity in landfill siting, uncertainties regarding the scale and scope of their emissions and differences in professional judgment remain. In order to build upon CalRecycle's understanding of WtE, CalRecycle staff conducted a detailed analysis of WtE and avoided landfill methane greenhouse gas (GHG) emissions, employing recent, peer-reviewed models."

8. **Health Protection Agency (England). 2009. The Impact on Health of Emissions to Air from Municipal Waste Incinerators.**
https://webarchive.nationalarchives.gov.uk/ukgwa/20140714074352/http:/www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1251473372218.

Preview: "The Health Protection Agency has reviewed research undertaken to examine the suggested links between emissions from municipal waste incinerators and effects on health. While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable. This view is based on detailed assessments of the effects of air pollutants on health and on the fact that modern and well managed municipal waste incinerators make only a very small contribution to local concentrations of air pollutants. The Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment has reviewed recent data and has concluded that there is no need to change its previous advice, namely that any potential risk of cancer due to residency near to municipal waste incinerators is exceedingly low and probably not measurable by the most modern techniques. Since any possible health effects are likely to be very small, if detectable, studies of public health around modern, well managed municipal waste incinerators are not recommended."

9. **Health Protection Scotland. 2009. Incineration of Waste and Reported Human Health Effects**
https://eipie.eu/wp-content/uploads/2021/07/REF00022-SEPA-2009-incineration_of_waste_and_reported_human_health_effects.pdf

Preview: "The thermal treatment of waste with energy recovery is recognised as a necessary part of sustainable waste management.

SEPA [Scottish Environmental Protection Agency] asked Health Protection Scotland to consider scientific studies on health effects associated with the incineration of waste; specifically non-occupational health effects and health effects from different waste streams such as clinical, hazardous, industrial and municipal. We also requested that the review take any recent studies (post 2004) into account, particularly those not included in the Defra publication Review of Environmental and Health Effects of Waste Management and after implementation of the revised European Waste Incineration Directive.

This report recognises that in older studies there remains uncertainty associated with the heath effects of incineration. However, it is important to note that the magnitude of any past health effects on populations living near incinerators is likely to have been small. Also, levels of airborne emissions from individual incinerators should be lower now than in the past, due to stricter legislative controls and improved technology, therefore further reducing risks to human health. This is in line with the recently published HPA review The impact on Health of Emissions to Air from Municipal Waste Incinerators, which states that 'While it is not possible

to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable.'

The recommendations in this report highlight inherent variations and weaknesses in existing studies, which creates a challenge when determining an overall conclusion on current health impacts. SEPA therefore acknowledge that any new studies, if commissioned, should be encouraged to focus on specific aspects of incineration and, where possible, examine nonoccupational health effects.

SEPA is content with the recommendation that the current precautionary regulatory approach is continued. Present controls are designed to protect human health and they are precautionary due to a level of uncertainty; therefore there is little rationale for an even more precautionary approach. SEPA will continue to apply the precautionary approach when regulating new and existing thermal treatment plants, and will take any new evidence into account."

10. **Medical Officer of Health, Durham Region, Ontario, Canada. 2007. Smith, Lesbia. F. Energy from Waste Facility in the Region of Durham. Report prepared for Medical Officer of Health.**
http://www.durhamenvironmentwatch.org/Incinerator%20Files%20II/REPORT%20FINAL.pdf

Preview: "With respect to health effects in communities around incinerators, the Halton 4A authors conclude that there are potential health concerns with incineration but the literature they cited generally involves old incinerators which have higher emissions than retrofitted or new incinerators. The Halton 4a Report agrees with the conclusions of the DEFRA 2004 (governmental) Report and with the conclusions of other review publications that state that EFW facilities using currently available modern (thermal) methods and pollution control technology are not expected to pose a significant risk to the public. In addition, the Halton 4A Report states that any new facility should be subject to a site specific risk assessment to identify local issues and ensure that it will not pose a risk to the public.

This author concludes that the current epidemiologic literature on health effects of incinerators on local communities (2000-2007) is inconclusive and does not demonstrate one way or another that modern incinerators have associated health effects on the people living around them. Some important new information provided greater insight into the assessment of health impacts of the new generation of incinerators. The direct testing for contaminants (biomonitoring) of people living around modern or upgraded incinerators provides a reasonably good baseline estimate of contaminant load. Such testing does not demonstrate an increased load of key contaminants emitted from incinerators. The literature does not provide any insight into the proportion of the contaminant load in people that is attributable to emissions from current modern technology incinerators. On the whole, the incinerator-generated contaminant load as measured in blood of residents living near-by is similar to the same contaminant load in other populations. Two possible explanations are considered: 1) emissions from incinerators are considered very small for dioxins, furans, and heavy metals; and 2) sources other than incinerators generally provide a higher proportion of the total burden of exposure for these contaminants than incinerators."

11. **Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. 2005. Waste Incineration — A Potential Danger? Bidding Farewell to Dioxin Spouting.** https://www.swa.org/DocumentCenter/View/6482/Waste-Incineration---A-Potential-danger--Bidding-Farewell-to-Dioxin-Spouting.

    Preview: "Emissions of toxic contaminants from waste incineration have been drastically reduced since 1990. Total dioxin emissions from all 66 waste incineration plants in Germany has dropped to approx. one thousandth as a consequence of the installation of filter units stipulated by statutory law: from 400 grams (cf. explanation below) to less than 0.5 grams."

12. **Department for Environment, Food and Rural Affairs (DEFRA). Enviros Consulting Ltd. and University of Birmingham. 2004. Review of Environmental and Health Effects of Waste Management: Municipal Solid Waste and Similar Wastes. Queen's Printer and Controller of HMSO.** https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69391/pb9052a-health-report-040325.pdf.

    Preview: "I am particularly encouraged by the report's conclusion that, on the evidence from studies so far, the treatment of municipal solid waste has at most a minor effect on health in this country particularly when compared with other health risks associated with ordinary day to day living. The evidence on environmental effects is limited, but such as there is does not appear to suggest adverse environmental effects of waste management, other than those we know about and are already addressing, such as methane emissions from landfill."

    "The review has concluded that the effects on health from emissions from incineration, largely to air, are likely to be small in relation to other known risks to health. I have confidence in this conclusion, particularly bearing in mind the fact that the current generation of municipal solid waste incinerators have to comply with much more stringent emission standards than those which formed the basis for the majority of studies of health effects in the literature. This does not mean that we can afford to be complacent; rigorous enforcement will be crucial to ensure that the new emission standards are not exceeded, and that non-standard operating conditions, as noted by the Royal Society, do not lead to levels of emission which would give rise to concern."

    "We found no consistent evidence for significantly elevated levels of ill-health in populations potentially affected by emissions from MSW incineration."

13. **Ontario, Canada. Environmental Sciences & Standards. Standards Development Branch, 1999. *Environmental Risks of Municipal Non-hazardous Waste Landfilling and Incineration: Technical Report Summary*. Ministry of the Environment, Environmental Sciences & Standards Division, Standards Development Branch.** https://archive.org/details/environmentalris00ontauoft/page/n1/mode/2up

    Preview: "It is the position of the Ministry of the Environment that both landfilling and incineration options be available for consideration so that a municipality or other proponent can develop the best environmental solution for its locality.

    The Ministry conducted a series of technical risk assessments of two generic disposal facilities: a large-scale incinerator and modern landfill with a similar disposal capacity of 6.6 million tonnes over 20 years.

Potential emissions from these hypothetical facilities were assessed for their potential impacts on human health and on the environment. Negligible effects are predicted for facilities that meet stringent requirements and standards for design, operation and pollution control. Therefore, concerns for human health and the environment should not limit the selection and approval of incinerators or landfills.

Specifically:

- No significant human health effects (those being cancer, lung disease, nerve damage or reproductive effects) are likely in a typical suburban community located near an incinerator or a landfill. Under certain conditions, nuisance problems linked to malodorous compounds may affect air quality close to a landfill.

- An ecological risk assessment predicts that water and sediment quality near an incinerator or landfill will meet Ministry guidelines for the protection of aquatic life.

- Direct or indirect impacts to the terrestrial environment, vegetation or wildlife resulting from incinerator or landfill emissions are not anticipated to be significant. The main differences in terrestrial impacts between the two waste disposal methods relate to the amount of land used and to the production of nitrogen oxides."

4 INTEREST GROUPS/TRADE GROUPS

This section presents resources from an international non-governmental association, an American university, an environmental law charity, a research center funded by the Australian National and Medical Research Council, and a consultancy that prepared a report for Zero Waste SA and the Government of South Australia.

1. **International Solid Waste Association (ISWA). 2024. ISWA's Position on Waste Incineration with Energy Recovery.** https://www.iswa.org/wp-content/uploads/2024/11/ISWA-Position-Paper-on-Waste-Incineration-November-2024.pdf

   Preview: "To ensure the environmental safety of waste incineration, ISWA emphasizes the need for stringent air pollution control measures enforced through strict regulations and permitting systems. Controlled waste incineration, conducted with strict monitoring systems and advanced pollution control technologies, minimises emissions and protects public health. Applying the best available technology and practice for emissions treatment in waste incineration will also act as a method to detoxify and remove hazardous waste and residues. There will still be residual fly ash, a hazardous residue that requires careful handling and disposal to avoid environmental contamination.

   In the EU, stringent air pollution measures for waste incineration are outlined in the Industrial Emissions Directive (Directive 2010/75/EU), which sets limits on pollutants emitted from waste incineration plants, including dust, gaseous and vaporous organic substances, hydrogen chloride and fluoride, sulphur and nitrogen oxides, heavy metals, dioxins and furans, and carbon monoxide, to protect public health and the environment."

2. **City College of New York. Marco J. Castaldi. 2021. Scientific Truth About Waste-To-Energy.** https://ccnyeec.org/wp-content/uploads/2021/05/WTE-REPORT7603.pdf

   Preview: "Independent studies show human health is not adversely affected by waste-to-energy. Further, WTE facilities in the U.S. and globally operate well within environmental standards. Data show their emissions are more than 70% below regulatory limits, except for NOx, which operates at 35 % below emissions limits."

   "The longstanding and well-documented scientific consensus is that human health is not adversely impacted by WTE. A National Research Council report in 2000 stated that pollutants such as particulate matter, lead, mercury, and dioxins and furans from well-run WTE facilities are expected to contribute little to environmental concentrations or to health risks (National Research council, 2000). The report called for more systematic studies to be done and a 2007 update states that epidemiological studies suggest there is no association between human health effects and the operation of WTE facilities (Chrostowski, 2007). A 2019 review stated that assessments of the impacts of WTE should consider direct pollutant emissions as well as the potential benefits of different waste management strategies on the community, suggesting that the health benefits of modern, properly managed WTE facilities may outweigh the health risks (Morgan et al., 2019). This section highlights several peer-reviewed scientific studies that present results showing WTE facilities do not adversely impact human health."

3. **ClientEarth. Ballinger, A., Shanks, W., Hogg, Dr. D., Sherrington, Dr. C., and Duffield, L. 2020. Greenhouse Gas and Air Quality Impacts of Incineration and Landfill.** Eunomia Research & Consulting Ltd, report to ClientEarth. https://www.clientearth.org/media/1h2nalrh/greenhouse-gas-and-air-quality-impacts-of-incineration-and-landfill.pdf

   Preview: "The air quality impacts of incinerators have been a key focal point of campaign groups representing those who are opposed to the development of incinerators. Analysis published on behalf of UK government bodies, however, has generally indicated there are no significant health concerns associated with pollution released from well-managed incineration facilities.In the UK context, studies on this topic include that undertaken by Enviros et al. on behalf of Defra in 2003. That study focussed primarily on an examination of epidemiological studies looking specifically at incinerators.33 It found relatively few studies of this nature, with those that did exist relating to older facilities with higher emissions. Even today there is relatively little in the way of research specifically focused on incinerators and health impacts: a study in the academic literature published this year and focussing on similar literature concluded there was "a dearth of health studies related to the impacts of exposure to WtE emissions".34 Later, the Health Protection Agency, which subsequently became part of Public Health England, undertook its own research of the literature and concluded:35

   > While it is not possible to rule out adverse health effects from modern, well regulated municipal waste incinerators with complete certainty, any potential damage to the health of those living close-by is likely to be very small, if detectable."

4. **Centre for Air pollution, energy and health Research (CAR). 2019. Cole-Hunter, Tom, Cowie, Christine, Johnstone, Fay, Marks, Guy, Morawska, Lidia, Morgan, Geoff, Overs, Margery, & Porta-Cubas, Ana. Position Paper: Waste-to-Energy processes: what is the impact on air pollutants and health?** https://www.car-cre.org.au/position-papers

   Preview: "Assessing the health impacts of waste incineration: A review of the epidemiological evidence of the potential health impact of all waste incineration (not including WtE processes) revealed inconsistent findings (12). Some studies found significant associations between exposure and adverse birth outcomes, lung/throat cancer and ischaemic heart disease, while other studies found no significant associations with these outcomes or other outcomes, including respiratory function and symptoms (12). In older studies, the review found consistent evidence of the presence of biomarkers related to waste products (such as organic compounds and heavy metals) in the blood or urine of incinerator workers (12) that may be avoided in newer incinerator systems. More hypothesis-driven epidemiological studies are needed.

   Inconsistencies in the evidence about the health impacts of exposure to waste incineration emissions may be due to the low sensitivity of exposure assessments used in epidemiological studies (13). More studies are needed to add to the weight and reproducibility of evidence."

5. **Zero Waste SA. Ricardo-AEA. 2013. Waste to Energy Background Paper. Report for Zero Waste SA. Ricardo-AEA/R/ED58135 i / Issue Number 5 – Final Report.** https://www.greenindustries.sa.gov.au/__media_downloads/165466/Waste%20to%20Energy%20Background%20Paper%20FINAL.pdf

   Preview: "W2E processes themselves impact on the environment, through emissions of greenhouse gases, pollutants, noise, dust and traffic. However modern, regulated W2E facilities pose no risk to human health and operate at levels commensurate with other industrial facilities;"

5 OVERVIEW OF EPIDEMIOLOGICAL LITERATURE

The scientific method for determining if emissions from an industrial source, such as a MSW WtE facility, have caused adverse health effects to members of the host community is the use of epidemiology tools. Epidemiologists compare the health effects data for groups of people known to be exposed to a chemical to the health effects data for groups of people who have the same general lifestyles but are not exposed to that chemical or who are exposed at substantially lower levels. The difficulties of designing a robust epidemiology study are many, but determining chemical exposure levels over long time periods is a major challenge.

To determine if an operating MSW combustor has caused adverse effects in people living in the host community, an estimate of exposure to the combustor emissions is needed. Most of the epidemiological studies performed over the years did not include exposure data. Instead, they simply used distance from the combustor (regardless of direction) as a surrogate for long-term exposure to combustor emissions. In actuality, exposures to chemicals of concern from MSW combustor stack emissions are higher at some distance from the facility because of plume rise, and exposures downwind are certainly higher than upwind exposures. These simple facts render the conclusions of most epidemiological combustor emissions studies less useful, because few studies have taken measurements or even considered the prevailing wind direction.

A more important issue in assessing the quality of an epidemiology study concerns the treatment of confounding exposures. If a MSW combustor is present in a community that also has other heavy industries, such as refineries, metal foundries, power plants, cement plants, etc., then it is virtually impossible to determine which emissions from which facility are associated with any observed effects.

The goal of this White Paper is to identify representative, high-quality review articles in which epidemiologists obtained a large number of studies of the health status of people living near MSW combustors. It was out of scope to identify and assess all of the individual studies that claimed to assess the health status of people living around MSW combustors because there are hundreds of such studies. However, some publications claim to have performed "systematic reviews" and made general conclusions about the state of the epidemiology literature.

Using the following search terms in USEPA's Abstract Sifter software of studies logged in the National Library of Medicine's MEDLINE database, 432 publications were identified that might have been relevant review articles (as of March 2025):

> (waste OR WTE OR WtE) AND (incinerat* OR combust*) AND (health OR risk OR epidemiolog*) AND ("meta-analysis" OR "meta-analyses" OR review)

These publications were screened by a Ph.D. level toxicologist, and 19 were identified for further review. However, all 19 publications were rejected for this White Paper and determined not to be useful in providing scientific information to the Broward SWA regarding the health impacts of MSW WtE facilities. Some of them were systematic reviews, but they were eliminated because they included publications that were off topic. Most of them included all manner of other potential sources of chemical exposures including combustors of medical waste, sewage, industrial waste, and hazardous waste, and other nearby sources of air pollution, such as thermal power plants, oil refineries, and heavy industries, such as aluminum production facilities.

Thus, no epidemiology review articles were suitable for this White Paper. However, this White Paper does include higher level documents from governmental agencies and scholarly bodies that have opined on the literature as a whole. Those documents are presented above, and some of them do cite primary epidemiological studies and epidemiological review articles.

As a general overview, many individual studies purport to assess one or more health effects, such as cancer, birth defects, or reproductive outcomes, in areas where combustors of some type were located. In many cases, the material combusted by the facility was not identified. In other cases, different types of waste were identified, including MSW, hazardous waste, industrial waste, medical/ clinical waste, commercial waste, mixed waste, sewage, sludge, solvents, oils, etc.

Confounding emission sources were rarely identified; however, some studies stated that the area of concern included other major sources of air emissions, such as thermal power plants, oil refineries, aluminum production facilities, etc. Other confounding exposures, such as workplace exposures from various local industries also typically were ignored.

In addition, many studies that continue to be cited today are out-of-date and would have little relevance to decision making in 2025. For instance, some studies include data about facilities that date to the early 1900's. In addition, little information about the level of sophistication of the air pollution control systems, if any, is presented in the older publications.

It is often possible to assess the relevance of a specific epidemiological study to decision-making about MSW WtE facilities by determining if the subject of the study is off topic, for instance, a hazardous waste incinerator. However, it is more difficult to determine the relevance of the findings in a review article, because review articles generally summarize such a large number of studies that no overall conclusions can easily be made about MSW WtE facilities specifically, and especially about relatively recent facilities.

In addition, all epidemiology studies of facility emissions have great uncertainties because the use of "distance to combustor" as a proxy for exposure to combustor emissions is such a poor metric. A few of the more recent studies have taken into account prevailing wind direction in an attempt to improve the accuracy of exposure estimation, but even this is a crude measure of exposure.

Lastly, epidemiological studies can only show statistical correlations. They cannot prove causation. So, the effects reported in any of the studies are only suggestive and require additional lines of evidence in order to draw sound conclusions.

Despite these drawbacks, one overarching conclusion from this literature can be made. Some old publications that assessed early generation combustors of various types of waste have reported a few adverse effects that were elevated in the people living closer to the facility than those living further away. In addition, more recent studies have reported fewer such effects or no effects at all.

Appendix Q

Task 7 White Paper – Implementation Plan and Timelines

Solid Waste Authority of Broward County, Florida

Task 7 White Paper: Implementation Plan and Timelines

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Appendix

Appendix A Status of ILA Member Franchise Agreements

1.0 INTRODUCTION

To develop the Regional Solid Waste and Recycling Master Plan (Master Plan), the SCS Team conducted several complementary studies to estimate existing and future solid waste quantities in Broward County as well as the processing capacity needs to manage those waste volumes for the Solid Waste Disposal and Recyclable Materials Processing Authority (Authority).

1.1 TASK 2 EXISTING RESOURCES WHITE PAPER SUMMARY

The Task 2 Existing Resources White Paper evaluates and describes existing solid waste disposal and recycling processes and resources currently operating in the County. As part of the Task 2 White Paper, the SCS Team developed a Solid Waste Mass Balance Model (Model) that estimates the tonnage of solid waste and recyclable materials generated within the County and tracks the flow of waste through the existing solid waste system to disposal facilities in four key phases: Generation, Collection, Transfer/Routing, and Diversion/Disposal.

1.2 TASK 4 FUTURE NEEDS ASSESSMENT WHITE PAPER SUMMARY

Using the Model-estimated solid waste and recyclable material tonnage, the Task 4 Future Needs Assessment White Paper identified the potential of future waste management systems to enhance waste recovery diversion and disposal, with the goal of achieving a 75% or higher recycling rate. Five practical scenarios are presented (designated Scenarios A to E), which are part of a continuum of necessary and sometimes difficult choices the Authority may consider if it intends to reach its goals. Task 4 demonstrates and ranks the types and scale of technologies, facilities, and programs that are available today and which most likely would be needed to meet future solid waste and recovered materials processing capacity to achieve the Authority's 75% waste diversion goal by 2045.

These comparative Scenarios were not intended to be prescriptive or provide an exact strategy to be implemented. Rather, they provide the initial physical modeling of the solid waste system components including program requirements, technologies, facilities and capacities required to manage the Model-estimated total waste generated by 2045. This includes estimated land needs, expected capital outlays, capital recovery, and operational costs, if the Authority were to decide to build and own a system to achieve the 75% waste diversion goal during the planning horizon.

Task 4 necessarily provides a clear picture of the effort required to reach state goals for Diversion and focusing on the model remains critical to establish a clear needs profile. This includes developing the capabilities to deliver the various current and planned waste material stream volumes to improve recycling and diversion and have them processed cost efficiently. However, the Authority must plan for the most practical, efficient and least costly way to begin enhanced diversion services now, by utilizing the wide variety of methods available in the Broward County/Authority marketplace based on current waste and recycling volumes today and their expected growth rate.

In addition, volume growth and full separation of potential waste streams for recycling will be a decades long endeavor that will likely have its own challenges and opportunities, and because of that, the need for additional facilities and their timing will be fluid and based on actual volumes and programs implemented. Importantly, this will require the Authority to focus upon short-to-mid-term utilization of strategic partnerships and competitive procurements with private contractors to yield faster results in the near to mid-term. This will enable the Authority to develop the needed internal capabilities and funding over time, while ILA members implement a strong foundation for the longer-term,

The Task 4 White Paper concludes that Scenario C is most likely to achieve the Authority's waste diversion goals. However, the Task 4 analysis is only the first step in facilitating further collaboration and discussions with the stakeholder community. For success over the long-term planning horizon, other factors such as cost, funding, enabling legislation, material/service homogenization, community/member/non-member acceptance, potential regional partnerships, and implementation of new technologies as they become available, must also be considered.

1.3 TASK 6 RECOMMENDATIONS AND FINDINGS SUMMARY

The Task 6 Recommendations and Findings White Paper ranks the scenarios developed in the Task 4 White Paper as the next step in the planning process, based on the estimated cost impacts associated with achieving the various goals of the Authority, such as waste minimization, recycling, reuse, diversion from landfills, zero-waste strategies, market risks, environmental impacts, safety, efficient processing of solid waste, and increased recycling. Scenario screening criteria were developed in order to evaluate and rank each of the five solid waste management scenarios presented in **Table 1** below.

Table 1. Scenarios and Goals: Cost and Other Impacts

Scenario	Recycling (Cost)	Reuse (Cost)	Diversion (Cost)	Zero Waste Strategies (Cost)	Market Risks (Cost)	Environmental Impacts, Health and Safety (Cost)	Cost Efficiency
A	Low	Low	Medium	Low	Low	Medium	High
B	High	High	High	Medium	High	High	Medium
C	High	High	High	Medium	High	High	Medium
D	Medium	Medium	Medium	High	Medium	High	Low
E	High	High	High	Medium	High	High	Low

1.3.1 Conclusions from Task 6

The lowest estimated cost for estimated goal impact is Scenario A and after stakeholder review is considered the most likely acceptable option to the Authority members. It also addresses the most practical immediate waste diversion needs while providing a strong foundation from which the Authority can pursue more progressive policies, programs, and processing investments as the Authority evolves. For this reason, it is selected as the recommended option most likely to be implemented. Scenario A is only a starting point in planning for the Authority's future solid waste management system; it will be modified as technologies, regulation, funding, environmental and technical research, needs, available private capacity, and policies change.

Scenario C has a higher impact for Zero Waste Strategies but also has higher costs, risks, land-use, and environmental, health, and safety (EHS) impacts.

Scenario E is the highest cost and highest risk alternative compared to goals.

1.4 TASK 7 IMPLEMENTATION PLAN AND TIMELINES

This Task 7 Implementation Plan and Timelines White Paper is intended to incorporate all of the information and analyses conducted during the six previous white papers into a cohesive plan for implementation by the Authority. Specific goals of this Implementation Plan include:

- Establish a timeline of available solid waste facilities and the phasing in of various municipal waste streams based on the termination dates of franchise agreements.
- Review potential opportunities to include spot market waste as part of the phasing schedule relative to capacity until all system waste is available.
- Provide recommendations for the flow of municipal waste to various solid waste facilities and transfer station locations.

This Implementation Plan is presented below in a stepwise fashion to provide a brief reiteration and a logical progression of the important data and information presented in the previous white papers.

2.0 WASTE FLOWS

As mentioned previously, the SCS Team developed a Model as part of the Task 2 White Paper. The Model estimates the tonnage of solid waste and recyclable materials generated within the County using publicly available data and information provided by Authority members and municipalities. The Model tracks the flow of waste through the existing solid waste system and includes four (4) key phases: Generation, Collection, Transfer/Routing, and Diversion/Disposal.

The Model projects waste flow by type and quantity from a 2020 baseline through 2065 (the Planning Horizon), incorporating factors such as population growth and other variables influencing the Authority's waste management planning. For each phase, the model calculates the total tonnage and material-specific breakdown of the waste stream for both Interlocal Agreement (ILA) members and non-ILA member municipalities. Using population growth and publicly available waste generation rates, the Model balances the total tonnage across the four phases to ensure all waste is accounted for. After verifying the mass balance, the model advances year by year, incorporating growth rates and other factors allowing prediction of when receiving facilities will reach capacity and require expansion, or when rerouting of waste to alternative sites will be required.

Based on projected population growth and assuming a continuing trend of increasing per capita waste generation, the Model calculations show the total solid waste tonnage generated by both ILA and non-ILA member municipalities increasing from approximately 4.1 million tons in 2020 to approximately 7.2 million tons in 2065. This significant projected growth in generated waste is the basis for the additional solid waste facilities identified by the SCS Team in the Task 4 White Paper and highlights the critical role those facilities will have in the future management of Broward County's solid waste.

2.1 EXISTING WASTE FLOWS

Some historical context is needed to understand how the existing solid waste management infrastructure developed in Broward County. As mentioned in the Task 2 White Paper, the County entered into an Interlocal Agreement (ILA) in 1987 with 26 municipal cities, which created the

Resource Recovery Board and Resource Recovery System. From 1987 to 2013, the System developed two Waste-to-Energy (WTE) facilities (North Broward Resource Recovery Facility (RRF) and the South Broward RRF), the Broward County landfill, and residential drop-off centers. However, the development of transfer stations, Recovered Materials Processing Facilities (RMPFs), and other solid waste processing facilities, was left to the private sector, driven by market demands and private business models. The ILA expired in 2013, leaving all Broward County municipalities individually responsible for the administration of contracts for the collection and disposal of their solid waste streams. Each municipality entered into collection agreements to collect and dispose of solid waste and to collect and process recyclables for single-family homes. Most commercial and multi-family properties contracted separately for private collection and disposal of solid waste and recyclables. The transfer and recycling infrastructure developed by the private sector materialized as dictated by these new contractual needs. Over time, a few municipalities discontinued their collection of recyclables.

Most of the existing solid waste and recycling infrastructure and capacity within Broward County is owned and operated by private entities (as discussed in the Task 6 White Paper). These private facilities manage most of the solid waste and recyclables generated in the County. The only existing publicly owned and operated solid waste infrastructure within Broward County are the Broward County Landfill, three County-owned recycling drop-off centers, and three publicly owned recycling and horticultural drop-off centers. Broward County also owns the South Broward Residue Landfill (i.e., Ash Monofill); however, it is operated by a private entity, WIN Waste.

Figure 1 below shows the Model-projected waste generation for 2025 for each municipality in Broward County, totaling approximately 5.3 million tons. Almost all of the waste tonnage shown is routed to and managed by private facilities. **Figure 2** is a graphical depiction of the overall flow of solid waste in the County.

Figure 1. Broward County Estimated Waste Generation by Municipality (2025)

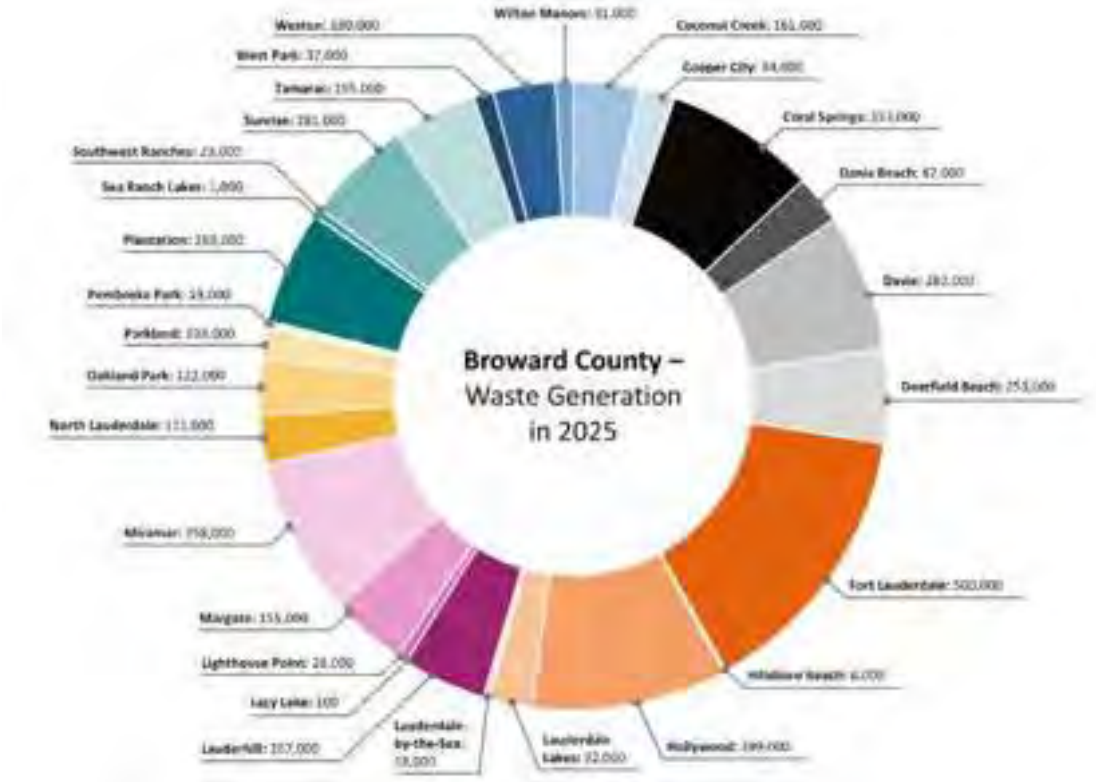
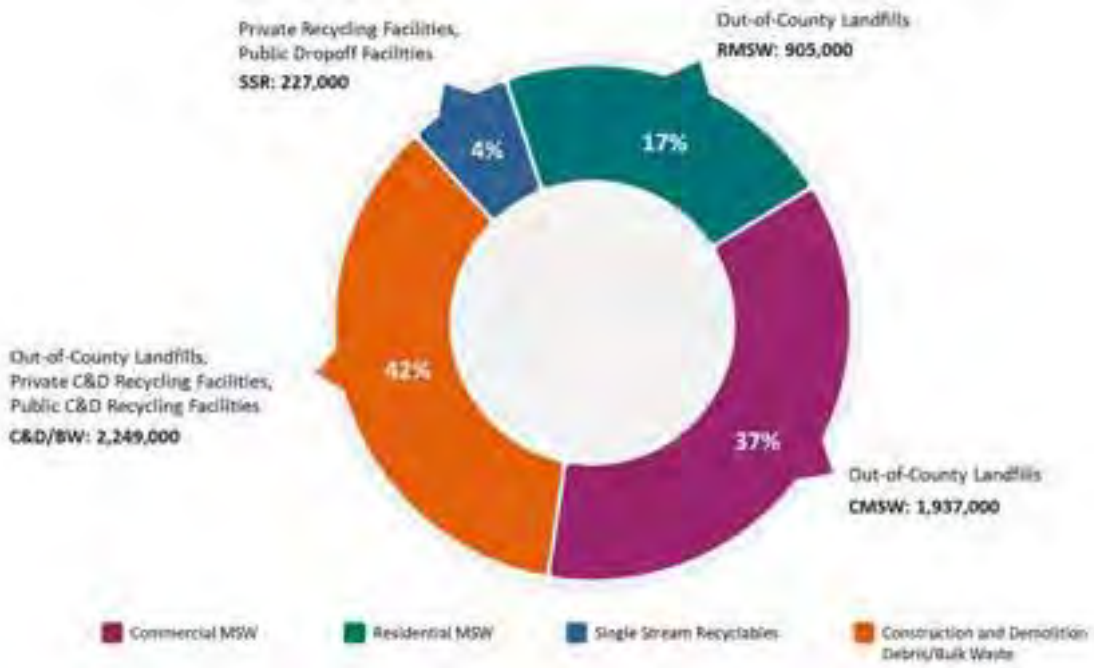


Figure 2. Broward County 2025 Estimated Tonnage of Waste Flows



2.2 PROJECTED WASTE FLOWS

Figure 3 shows the Model-projected waste generation for 2065 for each municipality in Broward County, totaling approximately 7.2 million tons. In order to manage the projected waste tonnage, additional transfer and disposal capacity will need to be secured through a combination of long-term contracts and the development of additional facilities. It will take several years to develop new solid waste and recycling facilities due to financing, permitting, and construction timelines. In the near term, the Authority will continue to rely on the existing solid waste infrastructure to provide for its solid waste and recycling needs.

Figure 4 is a graphical depiction of the overall flow of solid waste in the County. Note that Figure 4 assumes that the South Broward RRF is no longer in service in 2065.

Figure 3. Broward County 2065 Estimated Tonnage of Waste Generated by Municipality

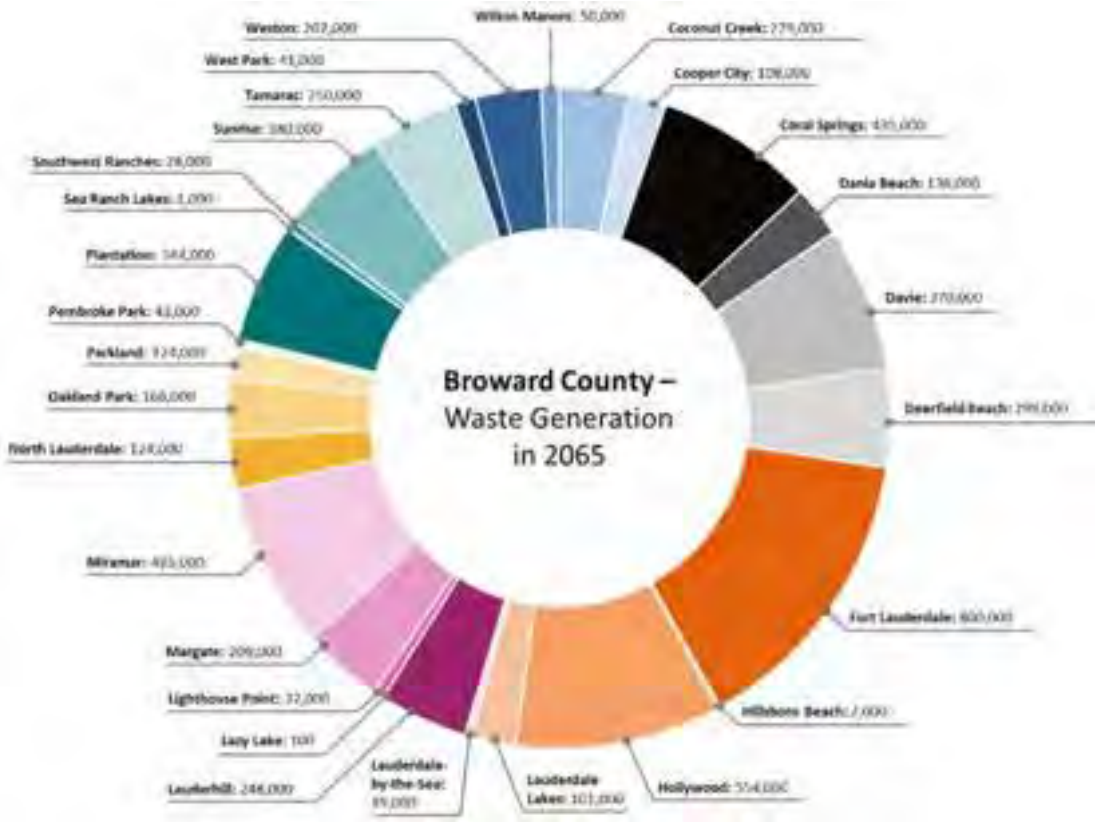
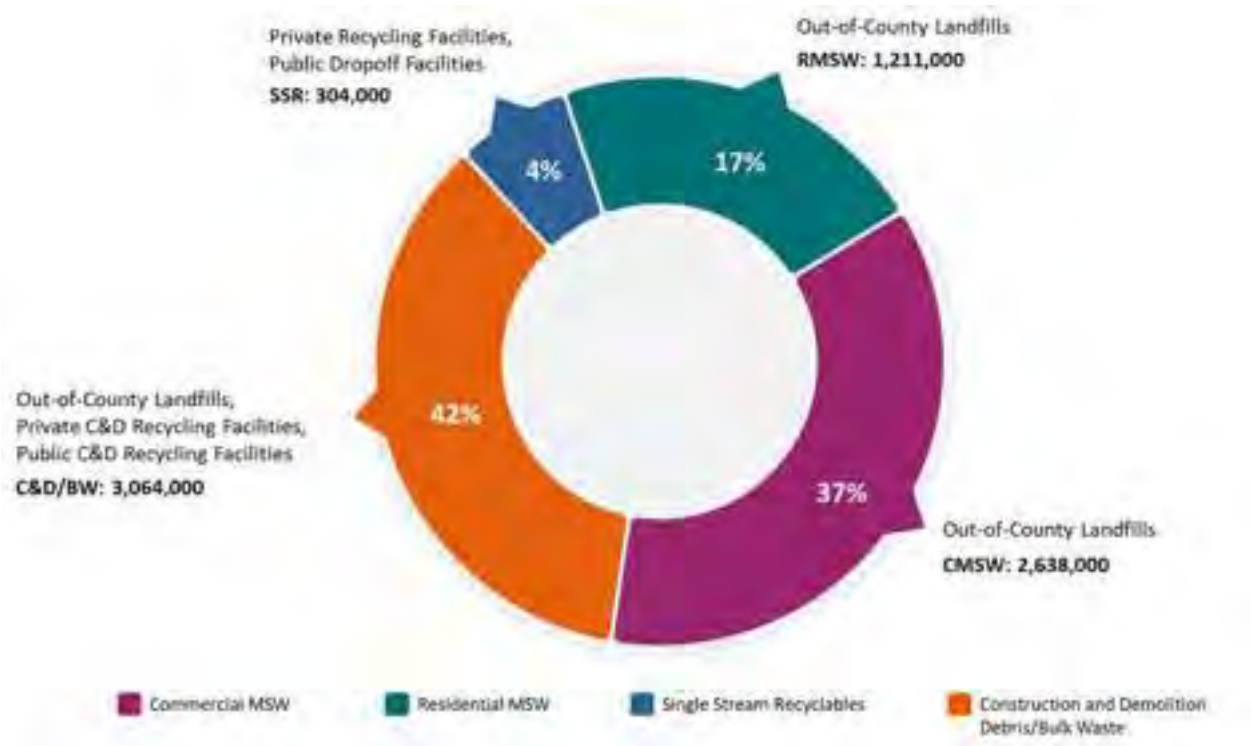


Figure 4. Broward County Estimated Waste Flows, 40-year Planning Horizon (Tons in 2065)



3.0 IMPLEMENTATION PLAN

The Implementation Plan is an incremental process that will be executed in a phased approach, based on the administrative powers granted to the Authority in the ILA, the expiration/renewal of franchise agreements, enacting new solid waste policies, and the availability of new public and private solid waste facilities. This implementation plan assumes that the South Broward RRF will continue to operate throughout the planning horizon.

3.1 CONTINUE ESTABLISHING THE BROWARD AUTHORITY

There are many important decision points and tradeoffs determining how the Authority is finally structured. The pursuit of perfection should not be a roadblock to progress as the Authority and the ILA communities work together to shape the foundation and collective future of their evolving integrated solid waste management system. The thoughtful development of the ILA between the Authority and the member communities and the specific administrative powers granted will be critically important.

One of the most important goals for the Authority's success will be controlling where ILA member waste is routed, which must be identified in the ILA member franchise agreements and service delivery contracts for waste processing. The sections below provide a framework for how these contractual mechanisms will establish and empower the Authority with the administrative powers necessary to accomplish its mission.

3.1.1 ILA Provisions

The administrative powers granted to the Authority will be governed by the ILA executed with each member community. To enable the Authority to accomplish its mission, the ILA must include consistent provisions that clearly delineate the responsibilities of both the Authority and ILA-member communities. These provisions will include, but are not limited to, the following:

Policy Flow – The Authority will develop ILA- board approved policies and ILA members agree to implement solid waste policies adopted by the Authority. Policies will be implemented over time as required, for instance as existing contracts end or fee structures to meet Authority goals are developed, by utilizing a phased approach respecting current ILA-member practices and concerns.

Level of Service – Each ILA member agrees to provide at least the same initial minimum level of collection service (e.g., one MSW, one Yard Trash, and one Curbside Single Stream Recycling collection pickup per week), while reserving their right to provide higher levels of service or collection frequency if desired.

Material Collection Requirements – ILA members agree to collect and separate materials uniformly as designated by the Authority. A key strategy of the Authority is to maximize the collection and value of recyclable materials through economies of scale and standardization of material waste streams, utilizing uniform and effective public messaging and outreach across ILA member geographies. This will increase common public awareness regarding waste reduction principles and Authority goals, participation in waste diversion and recycling programs, and decrease contamination in residential and commercial source separated materials bound for waste diversion processing.

Franchise Agreements for Commercial Collections – ILA members will adopt requirements that all private collection vendors servicing commercial, homeowner association, multi-family, and businesses obtain a franchise agreement that includes provisions supporting the goals of the Authority. For instance, allowing the Authority to direct MSW to a Designated Facility. These may also include uniform contract provisions that correspond to material collection requirements, etc. Note that ILA members could have franchise agreements with as many collection vendors as they want.

Franchise Agreements for Residential Collections – ILA members agree to include provisions allowing the Authority to direct a standardized list of collected materials to a Designated Facility in all new residential collection franchise agreements.

The following sections provide further discussion of the importance of each of the above ILA provisions and how they could be implemented.

3.1.1.1 Authority Policy Flow

One of the main purposes of the ILA and subsequent Authority is to guide and direct the solid waste policies of the ILA member communities so there is uniform management of solid waste throughout the County. This provides the Authority with a necessary fundamental power, as the member communities executing the ILA agree to defer policy decisions regarding waste management practices to the Authority. The Authority will be sensitive to and ameliorate the concerns of member communities in the development of those policies. However, once a policy decision is finalized, it must be implemented by all ILA-member communities. Key policies could include, but are not limited to, implementation of communications practices, variable container collection rates (PYT) to reduce disposed materials, mandatory residential and commercial recycling requirements, C&D ordinances, yard and food waste management ordinances, landfill bans on selected waste materials, etc.

3.1.1.2 Communications Platform

The Authority will maintain a cross-supply-chain communications platform with continuous common messaging, which will be utilized by all Authority members. It will be developed to be considerate to the concerns of all ILA-member communities.

3.1.1.3 Level of Service

Standardizing an initial minimum level of service with the same separated material streams provided by the member communities is crucial to ensuring that those material streams are prepared to available market specifications and collected Countywide, while equalizing, as much as possible, the rates that each member community will pay for residential collection services. Phased-in standardization will streamline public education and outreach, making it more cost effective through appropriate scaling of capital resources to efficiently meet service requirements and infrastructure needs. This will result in less confusion, reduced contamination, and reduced operating costs for improved recycling participation rates.

Importantly, whether each participating community chooses to maintain its own service and/or private Franchise service provider is not a priority of the plan, but capturing the required segregated material for diversion is critical. Additionally, ILA member communities may exceed the initial minimum level of service, if they so choose for the convenience of their residents at an additional cost provided the prepared materials are captured.

3.1.1.4 Material Collection Requirements

A fundamental power of the Authority, following the satisfaction of Formation Conditions identified in the ILA, is the ability to designate the waste streams collected and to enforce how these streams are prepared and segregated prior to collection. Segregated waste materials are critically important for recycling efforts in order to maintain the high quality required by processors and secondary markets. Additionally, a deployed communications strategy on a platform across communities on how and what to prepare, utilizing the latest real time technologies for delivery, would be adopted by all ILA-members which would reduce a great amount of confusion that leads to greater cross contamination of materials.

3.1.1.5 Franchise Agreements

Most municipalities (and ILA members) within Broward County maintain franchise hauling agreements with waste hauling and processing contractors, which grant the hauler and processor exclusive rights to collect and process waste within a defined geographic area for a specific duration.

These agreements typically have set terms including ownership of the waste, which direct the collected waste to private facilities or leave the disposal facility to the discretion of the franchise hauler and have an agreed expiration date with renewal clauses. These existing contracts effectively prevent ILA members from directing their residential waste to the Authority until they expire, and new terms are negotiated.

Commercial businesses, homeowner's associations, and multifamily residences generally contract separately for solid waste collection and disposal, and vendors servicing these properties may not have franchise agreements with the community where they operate.

The following sections detail how ILA provisions can be used in franchise agreements in order to give the Authority the administrative power it needs to accomplish its goals.

Franchise Agreements for Commercial Collection

Most commercial entities, multi-family properties, and many homeowner associations in Broward County contract individually for private collection and disposal of solid waste and recyclables, a practice which began after the expiration of the original ILA in 2013. In such private contracts, the collection vendors decide where to deliver the collected waste materials and may not have a municipal franchise agreement that directs the way they operate (what minimum services are provided and where the materials collected are processed for diversion or disposed). Under such conditions, the Authority would have no ability to determine minimum service levels, direct where the collected waste is delivered, or obtain data from the collection vendor regarding the type and tonnage of waste materials collected.

Establishing the Authority's power under the ILA would involve requiring all ILA-member communities to adopt the requirement that all collection vendors servicing commercial and multi-family businesses obtain a non-exclusive franchise agreement from the member municipality in which they operate. The agreement would include provisions allowing the Authority to direct the collected MSW to a Designated Facility, to phase in minimum levels of service and material preparation requirements and would also include reporting requirements regarding the tonnages and types of waste and recyclables being collected. Collection cost adjustments based on the Designated Facility would be incorporated into the private contract agreement between the commercial or multi-family property and the collection vendor. Note that ILA-member communities can execute franchise agreements with as many collection vendors as needed.

Franchise Agreements for Residential Collection

For residential collections, establishing the Authority's power under the ILA would be an incremental process coinciding with the expiration of existing agreements. The average contract for residential solid waste collection is around five years in the Southeast U.S., and for Franchise Collection contracts which require truck capital and other service requirement costs, are even longer. While most collection agreements have termination clauses, the use of such clauses to modify an agreement force the collection agreement into prolonged negotiations which could result in a disruption of collection service, while also resulting in higher resident costs, and is not recommended. Instead, the Authority can employ an incremental implementation approach, whereby when each ILA member franchise collection agreement expires it would be replaced with a new agreement incorporating the required terms defined in the ILA. ILA members may need to strategically utilize contract extensions or short term (one- to two-year renewal options), if this option is available in their existing contracts, in order to minimize service disruptions, while also aligning

their ability to incorporate Authority terms, once they are formally developed and adopted. Some examples of terms and strategies may include:

- Rate Stabilization and Adjustment rights through required changes to service, billing requirements, and directed disposal locations if these occur during a contract term
- Communication technology requirements and customer interface platforms deployed
- Billing requirements, i.e. utility, non-ad-valorem, or service provider
- Whether new Authority agreements would be Franchise Agreements or Service Contracts
- Whether service areas would be based on territories or on an exclusive agreement with the Authority (both may be more cost efficient depending on circumstance), or within municipal boundaries (less cost efficient but currently customary)
- Whether the same truck could be routed between member jurisdictions on the same day for efficiency
- Short, medium, or long-term contracts
- Service monitoring and compliance
- Customer complaint resolution

These and many other provisions in the terms are strategic and pivotal to meeting Authority waste program goals. Such important terms would also include initial minimum standardized levels of service and separated materials collection which would be set by the Authority. Additionally, it would empower the Authority to direct ILA member waste to a Designated Facility, which could be an existing solid waste facility or new future Authority facilities as they are developed. The agreement would also include reporting requirements regarding the tonnages and types of waste being hauled. Collection cost adjustments based on the Designated Facility could be incorporated into the agreement structure, if necessary, on a case-by-case basis. ILA members would continue to manage their franchise agreements as they did prior to the ILA.

Appendix A summarizes existing franchise agreements held by ILA members as well as important conditions such as termination for convenience, term expiration date, and extension abilities. The earliest contracts began expiring in early 2025, while the latest contracts expire in September 2031. Due to timelines for constructing new solid waste facilities, it may be preferable to allow existing contracts to expire as described in their franchise agreements, rather than pursuing termination clauses that could result in high legal fees and negatively impact business relationships with the franchise hauler community. If a residential franchise agreement expires prior to the finalization of Authority provisions, then the member community would ideally execute a short-term, one- to two-year agreement.

As the existing franchise agreements expire, new facilities will be planned over time to become available as designated facilities. **Table 2** below shows the number of residential collection franchise agreements expiring with the associated estimates for solid waste tonnage. As Deerfield Beach and Oakland Park perform their own collection, their tonnage is assumed to be available for management by the Authority in 2025. The franchise agreement expiration date for Hillsboro Beach is unknown, so it was assumed to expire in 2025.

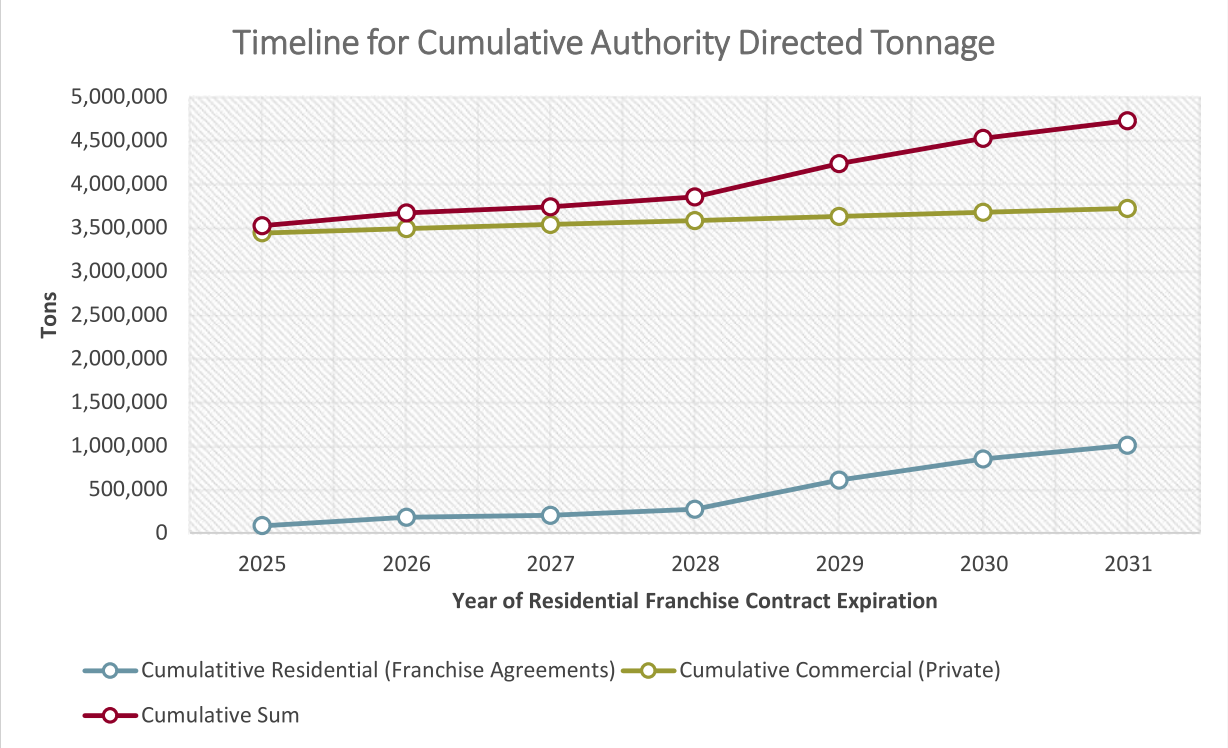
Table 2. Franchise Agreement Expiration and Annual Waste Tonnage Control

Year of Expiring Franchise Agreements	Number of Franchise Contracts Expiring	Associated Estimate for Residential Tonnage the Authority Could Direct	Total Estimated Cumulative Tonnage the Authority Could Direct
2025	3 (6 Members Free)*	82,000	82,000
2026	5	99,000	181,000
2027	1	20,000	201,000
2028	2	70,000	271,000
2029	7	335,000	606,000
2030	5	241,000	847,000
2031	3	159,000	1,006,000

** Note: Deerfield Beach and Oakland Park perform their own collection, therefore this tonnage is assumed to be available for management by the Authority in 2025. The franchise agreement expiration date for Hillsboro Beach is unknown (assumption was made that it expires in 2025).*

Figure 5 shows the estimated cumulative residential tonnage that is controlled by the provisions of the ILA and Authority, based on the expiration dates of the residential franchise agreements through 2031. Figure 5 also shows the total estimated commercial MSW tonnage that is assumed to be controlled by the ILA and Authority once provisions are implemented into commercial franchise agreements. Note that this does not include tonnages from non-ILA member municipalities.

Figure 5. Estimated Cumulative Residential and Commercial Tonnage Controlled by the Authority Based on Franchise Agreement Expiration



3.2 SECURE TRANSFER AND DISPOSAL CAPACITY

As mentioned previously, based on projected population growth and assuming a continuing trend of increasing per capita waste generation, the Model calculations show the total solid waste tonnage generated in Broward County increasing during the planning horizon from approximately 4.1 million tons in 2020 to approximately 7.2 million tons in 2065. This significant projected growth in generated waste highlights the critical need for the Authority to secure, either via contract or through public development, transfer and disposal capacity sufficient to manage the waste stream, which is estimated to be approximately 19,800 Tons Per Day (TPD) of solid waste by 2065. The following sections detail how that capacity could be secured.

3.2.1 Development of Private Transfer and Disposal Capacity

The Authority does not have the ability to influence the development, maintenance, or operation of the private solid waste infrastructure. However, the Authority can secure disposal capacity and encourage the development of new private facilities through ordinances, other policy mechanisms, and contractual methods, such as:

- Executing long-term disposal capacity contracts with existing private entities with incentives and disincentives such as elevated or volume-based processing fees and/or liquidated damages to ensure proper management of waste delivered, among other key provisions.
- Require processing of all waste collected or generated by municipal/public projects be processed and recycled in procurement contracts.

- Adopt policies that would encourage the use of existing private infrastructure to increase waste diversion from County or publicly owned disposal sites, such as mandatory commercial recycling or C&D recycling ordinances, i.e. permit requirements, disposal requirements, etc.

Additionally, the Authority in collaboration with members over time will also explore and implement uniform ordinances and/or service provider contract requirements across its member platform, which may include mechanisms such as potential surcharges or taxes on landfill disposal and/or minimum processing requirements to recover divertible materials on select materials streams to drive economic demand towards existing and new market entry recycling options while potentially helping to fund recycling development, noting the impacts landfill and WTE disposal has long term.

3.2.2 Development of Public Waste Management Capacity

Based on the results of the GIS desktop analysis conducted during the development of the Task 6 White Paper utilizing exclusionary criteria, minimal sites were identified that could potentially be developed for solid waste processing and disposal facilities within Broward County. One site was identified in the northern portion of the County, one site was identified in the southwest portion of the County, and the remaining seven sites were identified in the southeast portion of the County. The sites identified are not centrally located to serve all Authority stakeholders. However, when combined with existing public and private infrastructure, they potentially could be economically located to serve a portion of the nearby Authority stakeholder population centers, dependent on the facility type ultimately selected for development at the potential sites.

Currently, the only existing publicly owned and operated solid waste facilities within Broward County are the Broward County Landfill, three County-owned recycling drop-off centers, and three publicly owned recycling and horticultural drop-off centers. Broward County also owns the South Broward Residue Landfill (i.e., Ash Monofill); however, this solid waste facility is operated by a private entity, WIN Waste. These facilities are noted on **Figure 6** below.

Although needed disposal capacity for future waste flows can be secured through contracts, new solid waste transfer and other processing facilities for recycling will need to be developed within Broward County over time during the planning horizon, given the Authority cannot directly influence private facilities. To mitigate this condition:

- The Authority should begin an immediate prioritized procurement process to secure longer-term capacity for transfer and disposal. Different public/private options can include building and operating a Transfer Station and providing a third-party disposal site.
- The Authority may not be able to fully rely on the private sector to plan and develop the capabilities needed to serve all ILA-member communities at the projected growth rate. To mitigate the risk, the Authority may want to consider revisiting the exclusionary criteria used to identify potential sites for new solid waste facilities. Due to the limited number of available sites, the development of brownfield sites or redeveloping vacant commercial, public landfill footprints, and light industrial properties should be considered.

Figure 6. Public and Municipal Owned Solid Waste Processing Facilities in Broward County

3.2.3 Spot Market Waste

As a general rule for waste facility operators, should additional unused capacity be available at any of the Authority's facilities, acceptance of spot market waste should always be considered for capacity utilization and lowering of costs borne by member communities. However, due to foreseeable limited capacity, it may be unlikely that spot market or even longer term contracted MSW waste from non-ILA member communities outside of Broward County will be accepted at Authority-owned disposal facilities. Additionally, though recycling processing facilities may accept regional partner contracted material and some spot non-member, non-County material, these should be discounted in planning unless membership in the ILA or other cooperative arrangements are granted outside Broward County borders.

3.3 IMPLEMENTATION TIMELINE

This Implementation Plan begins with the decision by more than 75% of the Broward communities to approve the Solid Waste Master Plan and remain an ILA member community. Scenario A in the Task 4 White Paper proposed recommended policies and facilities for the Authority to implement and provided the approximate implementation timeline. Numerous factors such as budget, permitting, siting, site development, procurement, design, and approval process can impact facility implementation timelines. Public education is a critical component; therefore, public education and outreach should begin as soon as possible. In addition, public outreach should be designed and deployed to leverage zero-waste concepts that focus on waste minimization, reuse, and personal and corporate responsibility. The estimated timeline for the implementation activities is provided in **Table 3** below.

Table 3. Scenario A Implementation Timeline

Action-*	Description	Estimated Cumulative Implementation Time from Master Plan Approval
ILA and Policy Development	Negotiation of ILA provisions with all member communities, including concurrent with initial Authority policy development and franchise agreement provisions. Develop set of cascading actions to be executed, including policies, procurements for prioritized program elements, and communications with stakeholders concurrent with ILA negotiations	No Later Than August 16, 2026
Policy Alignment	ILA member communities formally adopt initial Authority policies, including material collection requirements as part of their local ordinance	1.5 years to est. 8 years depending upon current contracts, rates, program capacities, current policies, etc.
Authority Communications Platform	Develop procurements for connected Authority communications programs platform	1 year to select and procure preferred platform, 2 years to begin adoption and utilization by ILA member communities.

Action-*	Description	Estimated Cumulative Implementation Time from Master Plan Approval
Begin Public Education Campaign	Authority builds a high technology, attached and flexible communications platform and begins long-term multi-media campaign to educate residents and businesses about waste collection protocols, materials, recycling, etc.	2 years
Initiate Residential Franchise and Other Service Agreement Modifications	ILA member communities begin to convert residential collection franchise agreements to new Authority format as existing agreements begin to expire, including procurement strategies for collection and processing	1.5 years to 7 yrs (est. without potential renewals)
Initiate Commercial Franchise Agreements	ILA member communities formally adopt requirements for commercial franchise agreements	1.5 years
Begin Development of New Authority Transfer Facility No. 1	Site and begin development of new high-capacity Authority transfer station	2 years
Begin Development of New Authority Organics Processing Facility No. 1	Site and begin development of new 175,000 TPY-** capacity Authority organics processing facility or procurement of private sector solution	2 years
Level of Service Alignment	ILA members implement uniform minimum levels of solid waste collection service, including recycling and yard waste	3 years or aligning with contract terminations as they occur
Complete New Authority Organics Processing Facility No. 1	Secure agreement for 175,000 TPY of organics processing capacity or place new 175,000 TPY capacity Authority organics processing facility into operation	3 years
Begin Development of Public Drop-off Facilities	Site and begin development of eight public drop-off facilities	3 years
Secure Long-Term Recyclables Processing Capacity	Authority negotiates long term recyclable processing agreements with private RMPF vendors. Agreements should be flexible enough to allow the private development of a new facility (which requires tonnage commitments for a long period vs. use of existing capacity to ensure competition). Contract processing capacity should be sufficient to meet projected requirements for at least 10 years.	4 years
Secure Long-Term Disposal Capacity	Authority negotiates long-term disposal agreements with Broward WTE and out-of-county landfill vendors and transport agreements with railways. Contract disposal capacity should be sufficient to meet projected Concurrency requirements for at least 10 years.	4 years

Action-*	Description	Estimated Cumulative Implementation Time from Master Plan Approval
Begin Development of New Authority C&D Recycling Facility No. 1	Site and begin development of a new 450,000 TPY capacity C&D recycling facility	4 years
Begin Development of New SS RMPF No. 1	Site and begin development of new 250,000 TPY capacity Authority SS RMPF or pursue a procurement to identify a private sector solution	5 years
Begin Development of New Authority Organics Processing Facility No. 2	Site and begin development of second new 175,000 TPY capacity Authority organics processing facility or pursue a procurement to identify a private sector solution	5 years
Complete Authority Transfer Facility No. 1	Place Transfer Facility No. 1 into service	5 years
Complete Public Drop-off Facilities	Place eight new Public Drop-off Facilities into service	5 years
Begin Development of New Authority Transfer Facility No. 2	Site and begin development of new high-capacity Authority transfer station	5 years
Complete New Authority Organics Processing Facility No. 2	Secure agreement for 175,000 TPY of organics processing capacity or place new 175,000 TPY capacity Authority organics processing facility into operation	6 years
Complete Authority C&D Recycling Facility No. 1	Place C&D Recycling Facility No. 1 into service	6 years
Complete Residential Franchise Agreement Modifications	ILA member communities complete modification of all residential collection franchise agreements to new Authority format	7 years
Begin Development of New Authority C&D Recycling Facility No. 2	Site and begin development of a new 450,000 TPY capacity C&D recycling facility	7 years
Complete Authority C&D Recycling Facility No. 2	Place C&D Recycling Facility No. 2 into service	9 years
Complete New SS RMPF No. 1	Secure agreement for 250,000 TPY of SS recyclables or place new 250,000 TPY capacity Authority SS RMPF into operation	10 years
Complete Authority Transfer Facility No. 2	Place Authority Transfer Facility No. 2 into service	10 years

Action-*	Description	Estimated Cumulative Implementation Time from Master Plan Approval
Begin Development of New Authority Transfer Facility No. 3	Site and begin development of new high-capacity Authority transfer station	10 years
Secure Continued Long-Term Disposal Capacity	Authority negotiates long-term disposal agreements with Broward WTE and out-of-county landfill vendors and transport agreements with railways. Contract disposal capacity should be sufficient to meet projected Concurrency requirements for at least 10 years.	13 years
Complete Authority Transfer Facility No. 3	Place Authority Transfer Facility No. 3 into service	15 years
Secure Continued Long-Term Disposal Capacity	Authority negotiates long-term disposal agreements with Broward WTE and out-of-county landfill vendors and transport agreements with railways. Contract disposal capacity should be sufficient to meet projected Concurrency requirements for at least 10 years.	22 years
Begin Development of New SS RMPF No. 2	If needed, site and begin development of new 250,000 TPY capacity Authority SS RMPF or pursue a procurement to identify a private sector solution	22 years

**- Individual implementation step timing and feasibility is based on funding the needed infrastructure to get to the diversion goal of 75% and is dependent upon the need/benefit for the activity at that point in the plan where it begins and assumes no delays in preceding steps.*

***- Size and capacity of all facilities presented will be updated to reflect the projected capacity needs at the time of development, taking into consideration construction constraints and any private market capacity available that is more cost effective. This will ensure best prices for ILA-member residents as waste growth estimates and need are updated.*

4.0 CONCLUSIONS AND RECOMMENDATIONS

The Implementation Plan presented in this Task 7 White Paper is based on the analyses and research conducted during the development of the previous White Papers, and on the many years of solid waste experience of the SCS Team. This plan represents a feasible framework for establishing the powers of the Authority and provides a high-level, step-by-step progression of activities that will need to be implemented by the Authority and the ILA-member communities.

Change can be challenging and difficult to implement; however, if the Authority and the leadership of the ILA-member communities continue to collaborate, long-term solutions for the management of solid waste can be implemented which will gradually reduce the amount of waste disposed and increase the recycling and diversion rate, thereby improving environmental outcomes. All stakeholders should clearly understand that the Authority can only accomplish its goals by continually engaging with and considering the concerns of all ILA members and the communities they serve, while providing clear communication and transparency in its decisions.

Achieving the goal of 75% diversion will be challenging and will require a long-term commitment and funding to continuously educate the public about consumption practices, waste generation,

consequences of today's continued disposal practices, trade-offs in taxes and fees, and lifestyle choices to change the well-established habits of a culture of throwaway conveniences.

Additional concepts that are recommended for implementation in the future include:

- Adding a uniform requirement in franchise agreements and service contracts to collect and report data on tonnages collected, material types, waste composition, contamination rates and other information determined to be useful to ILA members and the Authority. This data would provide valuable information for use in making improvements to the solid waste system and adjusting public education, outreach or solid waste management practices as needed across the county.

- Begin work on underlying foundational policies including mandatory residential recycling, utilization of advanced mobile customer and service provider interfaces to improve communication, away from home recycling access, and procurement terms which ensure competitiveness for processing facilities and operating contracts.

- This Plan recommends longer-term franchise agreements for residential collection contracts because responsibility for the waste transfers to the service provider after collection in exchange for geographical exclusivity and so does managing that waste for meeting the goals of the Authority. Future contracts may require lower GHG-producing collection vehicles, truck monitoring of contamination in real time, and safe efficient behaviors on-route. Franchise agreements have been shown to be effective ways to increase landfill diversion on the West Coast and are prevalent there for that reason.

- The Plan also recommends non-exclusive commercial collection franchises which likewise require operators to carry out actions to meet Authority goals, could provide accessible reporting data on collection containers weights and services utilizing County interfaces in real time, and could be coordinated to utilize County-certified recycling facilities.

- A long-term consideration would be to divide the County into several franchise residential collection zones that would each be serviced by a single vendor. The franchise zones would be competitively bid, and no collection vendor would serve more than two zones to stimulate competitive pricing. This would leverage the economies of scale for collections and help reduce costs burdened by the public. Similar franchise zones have been successfully implemented in other Florida counties (Duval and Hillsborough, for example) and would be a consideration after the Authority is established.

- Consider adopting a policy of mandatory commercial recycling for as many readily recoverable materials as possible.

- Consider utilizing existing C&D and new recycling processing capacity contemplated in the implementation plan, by adopting minimum C&D recycling ordinances for certain construction and demolition activities (beginning at 25% and going up to 80% for fines use for alternative daily cover) for all projects that require a building permit. Also consider modifying the building permit system so the estimate of material weight recycled would be calculated in the permit application, and the permittee would have to provide receipts for the weight of material recycled (minimum what was calculated in the permit application) to close the permit and receive a Certificate of Occupancy. Finally, also

consider de-construction techniques to capture bulk clean demo materials at a demolition site for all County construction.

- Consider a regional RFP to attract glass processing for conversion to pozzolan cement for higher GHG savings for glass potentially collected in recycling program efforts within the Authority. Work at the University of Florida has recommended this as a potential higher use for glass but one facility consumes a lot of glass (60K TPY). Alternatively, consider separate collection of glass and development of a pulverizing facility to convert glass to sand that can be reused as fill material, etc.

- Consider intensive lobbying efforts at the State level aimed at revising the rules related to food waste. Currently food waste is regulated as a solid waste in Florida, which is highly restrictive and is a significant limiting factor for the development of large-scale food waste diversion programs.

- Continuous monitoring of recyclables and if the private sector facilities run into capacity issues, then it would be recommended to consider developing a new RMPF owned and operated by the Authority.

- The Authority should consider partnering with the State and perhaps the Federal Small Business Administration (SBA) to offer grants and/or low-interest loans to stimulate the development of recycling businesses in Broward County. Such businesses would provide critically important secondary markets and drive demand for collected and processed recyclables.

Appendix A

Status of ILA Member Franchise Agreements

ILA Member	Collection Hauler	Current Material Destination	Franchise Agreement Contract Date & Term	Termination Clause	Contract End Date	Estimated Residential Tonnage Available (Year of Contract Termination)
Large Members' ILAs						
Coral Springs	Coastal Waste & Recycling	Solid Waste: South Broward RRF[1] Recycling: WM Recycling Deerfield (Sun 11)[1] C&D/White Goods: WM Recycling Deerfield[1]	7/23/2023	N	9/30/2031	87,000
Davie	Coastal Waste & Recycling	Solid Waste: South Broward RRF[1] Recycling: South Broward RRF[1] C&D/White Goods: WM Oakes Road[1]	1/20/2021 (7 Years)	N	12/31/2030	69,000
Deerfield Beach* **	Municipality	Solid Waste: WCF Deerfield Beach Transfer Station[1] Recycling: Residential drop off location or WM Recycling Deerfield for commercial recycling[1] C&D/White Goods: WCF Deerfield Beach Transfer Station[1]	N/A	N/A	N/A	41,000
Fort Lauderdale	Waste Management	Solid Waste: South Broward RRF[1] Recycling: Reuter Recycling[1] C&D/White Goods: WM Oakes Rd or Monarch Hill Landfill[1]	7/31/2023 (7 Years)	Y	7/30/2030	106,000

ILA Member	Collection Hauler	Current Material Destination	Franchise Agreement Contract Date & Term	Termination Clause	Contract End Date	Estimated Residential Tonnage Available (Year of Contract Termination)
Hollywood	Waste Pro	Solid Waste: Broward South RRF[1] Recycling: Broward South RRF[1] C&D/White Goods: WM Oakes Road[1]	NP	Y	9/30/2029**	86,000
Lauderhill	Waste Management	Solid Waste: South Broward RRF[1] Recycling: Reuter Recycling[1] C&D/White Goods: WM Oakes Rd[1]	8/29/2016 (3, 5 Years)	N	9/30/2026	36,000
Miramar	Waste Pro	Solid Waste: South Broward RRF[1] Recycling: Reuter Recycling[1] C&D/White Goods: WM Oakes Rd	4/13/2022 (7 Years)	N	4/30/2029	105,000
Plantation	Waste Management	Residential MSW: South Broward RRF[1] Commercial MSW: South Broward RRF[1] Residential Source Separated Recyclables: Reuter Recycling[1] Commercial Source Separated Recyclables: Reuter Recycling[1] C&D and White Goods: South Broward RRF[1]	10/01/2016 (expired on 9/30/2023 and renewed for additional 5-year term)	Y	9/30/2028	63,000
Sunrise	Republic Services	Residential MSW: South Broward RRF[1] Commercial MSW: South Broward RRF[1] Residential Source Separated Recyclables: South Broward RRF[1] Commercial Source Separated Recyclables: Envirocycle[1] C&D and White Goods: WM Oakes Road[1]	11/16/2023 (approx. 5 Years)	N	1/31/2030	59,000

ILA Member	Collection Hauler	Current Material Destination	Franchise Agreement Contract Date & Term	Termination Clause	Contract End Date	Estimated Residential Tonnage Available (Year of Contract Termination)
Medium Members' ILAs						
Coconut Creek	Republic Services	Solid Waste: WM Recycling Deerfield or South Broward RRF[1] Recycling: City drop-off facilities[1] or WM Recycling – Deerfield / Davie[1] C&D/White Goods: Waste Connections Deerfield[1] or South Broward RRF[1]	10/1/2019 (5 Years)	N	9/30/2026	27,000
Cooper City	Coastal Waste & Recycling	Solid Waste: South Broward RRF[1] Recycling: WM Reuters PP[1] or WM Davie Transfer[1]; C&D/White Goods: WM Oakes Rd[1]	1/9/2024 (7 Years)	Y	3/31/2031	31,000
Lauderdale Lakes	Waste Management	Solid Waste: WM Recycling Deerfield [2] or South Broward RRF[1] Recycling: WM Deerfield Recycling, or other facility directed by WM[1] C&D/White Goods: WM Oakes Road[3] with Bulky Waste and Yard Waste sent to South Broward RRF[1]	12/9/2009 (Unknown)	N	9/30/2029	12,000
Margate	Republic Services	Solid Waste: South Broward RRF[1] Recycling: South Broward RRF[1] C&D/White Goods: South Broward RRF[1]	2/1/2022 (7 Years)	N	9/30/2029	33,000

ILA Member	Collection Hauler	Current Material Destination	Franchise Agreement Contract Date & Term	Termination Clause	Contract End Date	Estimated Residential Tonnage Available (Year of Contract Termination)
North Lauderdale	Waste Management	Solid Waste: South Broward RRF[3] or Monarch Hill LF[2] Recycling: South Broward RRF[1] C&D/White Goods: WM Recycling Deerfield[3]	7/13/2021 (7 Years)	N	12/31/2026	27,000
Oakland Park* **	Municipality	Solid Waste: WCF Deerfield Beach R&T[1] Recycling: WM Deerfield[1] C&D (Not collected) /White Goods: WM Recycling - Deerfield[1]	N/A	N/A	N/A	27,000
Parkland	Waste Management	Solid Waste: South Broward RRF[1] Recycling: WM Recycling - Deerfield[1] C&D/White Goods: WM Recycling – Deerfield[1]	4/23/24 (5 Years)	N	9/30/2029	35,000
Tamarac	Waste Management	Residential MSW: Broward South RRF[1] Commercial MSW: Broward South RRF[1] Residential Source Separated Recyclables: WM Recycling Deerfield[1] Commercial Source Separated Recyclables: WM Recycling Deerfield or Reuter Recycling[1] C&D and White Goods: WM Deerfield (Sun 2)[1]	6/24/2024 (7 Years)	Y	9/30/2031	41,000
Weston	Republic Services	Solid Waste: Reuter Recycling[2] Recycling: Reuter Recycling[2] C&D/White Goods: Reuter Recycling[2]	3/5/2024 (5 Years)	Y	3/31/2029	50,000

ILA Member	Collection Hauler	Current Material Destination	Franchise Agreement Contract Date & Term	Termination Clause	Contract End Date	Estimated Residential Tonnage Available (Year of Contract Termination)
Small Members' ILAs						
Broward Municipal Services District (Unincorporated)	Coastal Waste & Recycling of FL	Solid Waste: South Broward RRF[1] or WM Recycling Deerfield[2] Recycling: Coastal Recycling #4[1] C&D/White Goods: WM Oaks Rd[1]	4/1/2020 (5 years + two 1-year renewals)	Y	3/31/2027	14,000
Dania Beach	Waste Management	Solid Waste: South Broward RRF[1] Recycling: WM Deerfield Transfer Station or South Broward RRF[1] C&D/White Goods: WM Oakes Rd[1]	12/1/2015 (7 Years)	Y	9/30/2027	20,000
Hillsboro Beach	Waste Pro	Solid Waste: WCF Deerfield Beach Recycling & Transfer[2] Recycling: WM Recycling Deerfield/Davie[2] C&D/White Goods: WM Oakes Rd[3]	NP	NP	NP	350
Lauderdale-by-the-Sea	Waste Pro	Solid Waste: Deerfield Beach Transfer and Recycling[2] Recycling: WM Recycling – Deerfield or Davie[2] C&D/White Goods: Deerfield Beach Transfer and Recycling[3]	11/1/2021 (3-5 Years)	N	10/31/2026	2,000
Lazy Lake	Coastal Waste & Recycling	Solid Waste: South Broward RRF[2] Recycling: Reuter Recycling[2] C&D/White Goods: WM Oakes Rd[3]	12/15/2023 (7 Years)	N	9/30/2030	20

ILA Member	Collection Hauler	Current Material Destination	Franchise Agreement Contract Date & Term	Termination Clause	Contract End Date	Estimated Residential Tonnage Available (Year of Contract Termination)
Lighthouse Point	Waste Management	Solid Waste: Waste Management Deerfield[1] Recycling: Waste Management Deerfield[1] C&D/White Goods: Waste Management Deerfield[1]	3/26/2024 (7 Years)	Y	9/30/2028	7,000
Pembroke Park	Waste Management	Solid Waste: Pembroke Park Transfer and Recycling[2] Recycling: Pembroke Park Transfer and Recycling[2] C&D/White Goods: WM Recycling Dania Beach[3]	NP	NP	12/31/2025**	3,000
Sea Ranch Lakes	Waste Management	Solid Waste: WM Recycling Deerfield[3] Recycling: WM Recycling Deerfield[3] C&D/White Goods: WM Recycling Deerfield[3]	5/28/2010 (approx. 3 Years)	NP	2/28/2025	250
Southwest Ranches	Waste Management	Solid Waste: Reuter MRF[1] Recycling: Reuter MRF[1] C&D/White Goods: Reuter MRF[1]	7/28/2022 (approx. 8 Years)	N	9/30/2030	8,000
West Park	Waste Pro	Solid Waste: South Broward RRF[2] Recycling: Reuter Recycling[2] C&D/White Goods: WM Oakes Rd[3]	10/18/2020 (up to 5 years per term)	N	12/31/2025	12,000

ILA Member	Collection Hauler	Current Material Destination	Franchise Agreement Contract Date & Term	Termination Clause	Contract End Date	Estimated Residential Tonnage Available (Year of Contract Termination)
Wilton Manors	Coastal Waste & Recycling	Residential MSW: Broward South RRF(1) Commercial MSW: Broward South RRF(1) Residential Source Separated Recyclables: WM Recycling Deerfield(1) Commercial Source Separated Recyclables: Coastal Waste & Recycling #4(1) C&D and White Goods: WM Deerfield (Sun 11)(1)	9/12/2023 (3 Years)	Y	9/30/2026	7,000

* Contract information for this ILA member was not available. 2025 values are assumed as the Authority would be able to direct its waste once ILA provisions have been made
** This date was provided by Solid Waste and Recycling Services, otherwise the dates listed were from provided collection and hauling contracts
*** This Municipality provides its own collection services. 2025 values are assumed as the Authority would be able to direct its waste once ILA provisions have been made
(1) Destination information was determined based on review of collection and hauling contracts or was confirmed by the municipality
(2) Destination information was provided by the Authority or determined from municipal website
(3) Destination information was assumed based on distance, collector, facility owner and permit of nearby facilities
NP – Contract or information not provided
N/A – The municipality hauls its own waste