Memorandum

MIAMI-DADE COUNTY

Date: June 24, 2025

Agenda Item No. 2(B)(3)
July 16, 2025

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Cover Memo for the Comprehensive Report on Solid Waste Management – Directive No. 250538

Executive Summary

On February 19, 2025, the Board of County Commissioners (Board) approved Resolution No. R-198-25 ("Resolution"), sponsored by Chairman Anthony Rodriguez and Commissioner Juan Carlos Bermudez, which was amended to include all solid waste items passed by the Board in the previous 45 days as part of the comprehensive analysis and to extend the 90-day timeline to 120 days for consistency with other related items at the administration's request.

This comprehensive report contains a full review and analysis involving industry experts from all available sectors of waste management to further explore the feasibility of constructing a new waste-to-energy (WTE) facility, as well as reports addressing the directives presented at the Committee of the Whole on January 28th and the February 19th Board meetings (detailed below).

During the process of compiling this report, staff went to great lengths to receive as much input as possible from industry sources, as directed by the Board. This effort, which follows months of previous analysis and review of all possible options for the future of our waste system, reinforced our understanding that there simply is no easy solution when it comes to waste management. As Mayor, my objective is to always deliver critical, quality services to our residents in a financially and environmentally responsible and efficient way. We recognize the need to manage the loss of the Resource Recovery Facility (RRF) to ensure we can continue to meet our growing community's waste disposal needs, as well as the need for a solution that integrates into a broader Zero Waste strategy as we seek to reduce our overall waste output. At the same time, it is critical that any options we pursue do not create an undue burden to our ratepayers, particularly at a time of mounting pressures on the County's resources.

It is important to point out that despite staff's repeated efforts to follow up with industry respondents to receive specific answers to key information, no firms that responded regarding WTE solutions provided specific siting details or offered their own property details to implement their waste solutions. Several firms suggested to utilize County provided properties with lease arrangements. In various categories, despite repeated follow-up, respondents did not provide specific cost information.

After compiling this report, the administration's recommendation remains the same as that outlined in the latest January 2025 report regarding site selection for a solid waste campus: that we continue to long-haul waste via truck and rail using our contracted capacity, while we continue exploring options to build a landfill outside of Miami-Dade County.

Summary of the Package Contents

Resolution No. R-198-25 directed the County Mayor or County Mayor's designee to do the following:

1. Undertake a comprehensive review and analysis involving industry experts from all available sectors of waste management to further explore the feasibility of constructing a new WTE facility; solicit information and technical advice from waste management industry experts on the best available delivery options and recommended procurement approaches for the design, construction, operation and/or maintenance of a new WTE facility for the County including but not limited to: (1) traditional government procurement methods such as design-build solicitations; (2) Public-Private Partnership (P3) agreements; and (3) utilizing unsolicited proposals to determine which approach is the most cost and time efficient for the delivery of a WTE facility; not limit its comprehensive analysis to already-identified potential sites or locations nor to assumptions as to the size and capacity of the WTE facility; explore all available options with waste management industry experts including but not limited to constructing a larger regional WTE facility with other local governments or the State of Florida or building a smaller facility combined with utilizing other waste disposal methods such as landfills or hauling waste; explore with waste management industry experts all waste disposal methods the Board has directed the County Mayor or County Mayor's designee to analyze in items passed by the Board within the last 45 days; explore and analyze available funding sources and technologies, including P3s, federal tax credits, and federal and state grants, to contribute to or defray the costs of the County's solid waste system including any construction, operation and maintenance costs associated with a solid waste campus, WTE facility, or landfill expansion.

2. Maximize input from industry sources and to disclose to the Board all efforts made to maximize such input, identify all industry sources from which information and recommendations were received, and disclose all recommendations from industry sources; ask waste management industry experts to address the challenges identified by the County Mayor in her January 2025 Report in building a new WTE facility.

3. Prepare a written report addressing all the directives set forth in this resolution. The County Mayor or County Mayor's designee shall submit and place on an agenda of the full Board without committee review pursuant to Rule 5.06(j) of the Board's Rules of Procedure. To the extent that the Board had previously directed the County Mayor or County Mayor's designee in Board items passed within the last 45 days to prepare and submit reports to the Board on waste disposal options, such directive reports shall be consolidated into the report and information due within 120 days pursuant to this resolution.

The following reports addressing the directives presented at the Committee of the Whole on January 28th and the February 19th Board meetings are attached for reference as follows:

(1) Directive No. 250538 (Resolution No. R-198-25) **–** Comprehensive Review and Analysis of Waste Management Strategies (Co-Prime Sponsors: Chairman Rodriguez and Commissioner Bermudez)

(2) Directive No. 250174 (Resolution No. R-190-25) **–** Report to Request and Receive Certain Information from the Design Criteria Professional (Sponsor: Commissioner Regalado)

(3) Directive No. 250299 (Resolution No. R-196-25) - Report to Assess and Evaluate the County's Landfill Capacity (Sponsor: Commissioner Bermudez)

(4) Directive No. 250195 (Resolution No. R-191-25) **-** Report on the Feasibility of Expanding Cardboard Recycling at Trash and Recycling Centers and Establishing Seasonal Cardboard Disposal Program (Sponsor: Commissioner Regalado)

(5) Directive No: 250208 (Resolution No. R-192-25) – Report on Evaluating Legally Viable Options for the Purchase of Suitable Sized Land Outside of Miami-Dade County (Sponsors: Commissioner Regalado and Commissioner Cohen Higgins)

(6) Directive No. 250227 (Resolution No. R-186-25) **–** Report on the County's Engagement with Broward County and Palm Beach County to Find Solutions to Solid Waste Management Problems (Sponsor: Commissioner Bermudez)

(7) Directive No. 250304 (Resolution No. R-197-25) - Report on the Development and Implementation of Tire and Mattress Recycling (Sponsor: Commissioner Regalado)

(8) Directive No. 250224 (Resolution No. R-194-25) **-** Report on Methane Gas Extraction at Existing Miami-Dade County Landfills (Sponsor: Commissioner Regalado)

(9) Directive No. 250172 (Resolution No. R-189-25) **–** Report on the Review of Solid Waste Bond Ordinance (Sponsor: Commissioner Regalado)

(10) Directive No. 250166 - Report to the Board Regarding New Technologies Available for the County's West Transfer Station Facility (Sponsor: Commissioner Cabrera)

(11) Directive No. 250222 (Resolution No. R-193-25) – Update on Closed Loop Recycling (Sponsor: Commissioner Regalado)

(12) Directive No. 250196 (Resolution No. R-187-25) – Update on School Board Recycling Curriculum (Co-Prime Sponsors: Commissioner Gilbert and Commissioner Steinberg)
Additional Attachments

Attachment 1 and 2 (combined report) -
Report on Market Research on All Solid Waste Management Methods, Waste-to-Energy (WTE) Financing/Procurement Options, and Federal, State, and Local Funding Options; Develop and Present an Alternative Solid Waste Management Plan – **Directive No. 250538 (Resolution No. R-198-25)**

Summary of Request:

1. Expert Consultation
    - Solicit information and technical advice from waste management industry experts.
    - Assess best available delivery options and recommended procurement approaches for the design, construction, operation, and/or maintenance of a new WTE facility.
2. Waste Disposal Methods
    - Explore all waste disposal methods the Board has directed for analysis.
    - Review items passed by the Board within the last 45 days.
3. Funding and Technology Analysis
    - Investigate funding sources and technologies to contribute to or defray costs of the County's Solid Waste system.

- Assess financial feasibility of construction, operation, and maintenance costs associated with a solid waste campus, WTE facility, or landfill expansion.

Report to Request Information from the Design Criteria Professional **- Directive No. 250174 (Resolution No. R-190-25)**

Summary of Request:

1. Request and Receipt of Certain Information from the Design Criteria Professional
2. Utilize existing Contract No. 18482-DSWM22-DCP SPD Project No. E22-DSWM-02

Attachment 3 - Report on Miami-Dade County's Landfill Capacity and Viable Options for Expansion **- Directive No. 250299 (Resolution No. R-196-25)**

Summary of Request:

1. Determine if expansion of landfills is in the County's best interest
2. Evaluate the viability of landfill expansion performing a cost/savings analysis of expansion options.

Attachment 4 - Report on the Feasibility of Expanding Cardboard Recycling at Trash and Recycling Centers and Establishing Seasonal Cardboard Disposal Program **- Directive No. 250195 (Resolution No. R-191-25)**

Summary of Request:

1. Expansion of cardboard disposal and/or recycling to all 13 Trash and Recycling Centers year-round.
2. Establishment of a seasonal cardboard disposal program.
3. Creation of additional drop-off sites throughout the community at locations such as:
    - Libraries
    - Community Centers
    - County or Municipal Buildings
4. Create Public Awareness and Accessibility on County's website and social media outlets.
    - Existing Trash and Recycling Centers accepting cardboard materials.
    - Any future seasonal locations.
5. Integration into Zero Waste Master Plan
    - Ensure that year-round and seasonal disposal and/or recycling of cardboard is included in the County's Zero Waste Master Plan.

Attachment 5 – Report on Out-of-County Landfill Options - **Directive No: 250208 (Resolution No. R-192-25)**

Summary of Request:

1. Land Acquisition Evaluation
    - Assess legally viable options for purchasing suitable land outside of Miami-Dade County near a rail line for landfill and/or composting purposes.
2. Fiscal Impact Analysis
    - A comprehensive fiscal impact line-item in the report.

- The financial analysis comparison of current landfill service expenditures against the projected costs of acquiring and developing new landfill facilities, including all associated operational requirements.

Attachment 6 – Report on the County's Engagement with Broward County and Palm Beach County to Find Solutions to Solid Waste Management Problems **– Directive No. 250227 (Resolution No. R-186-25)**

Summary of Request:

1. Intergovernmental Engagement
   - Continue discussions with Broward County and Palm Beach County to identify solutions for solid waste management challenges.
2. Reporting Requirement
   - A report detailing findings and proposed solutions must be provided.

Attachment 7 - Report on the Development and Implementation of Tire and Mattress Recycling **- Directive No. 250304 (Resolution No. R-197-25)**

Summary of Request:

1. Development and Implementation
   - Establish a countywide recycling program for tires and mattresses.
2. Review and recommend necessary changes to Chapter 15 of the Miami-Dade County Code to align with the new recycling initiative.
3. Provide a comprehensive report detailing the proposed recycling program, implementation plan, and any required legislative adjustments.

Attachment 8 - Report on Methane Gas Extraction at Existing Miami-Dade County Landfills **- Directive No. 250224 (Resolution No. R-194-25)**

Summary of Request:

1. Assessment of Legal Viability
   - Conduct a comprehensive evaluation of legally viable options for methane gas extraction from existing and future landfills within Miami-Dade County.
2. Environmental and Economic Impact
   - Analyze the potential environmental benefits and economic feasibility of methane gas extraction.
3. Regulatory Compliance
   - Identify applicable laws, policies, and regulations governing methane extraction in landfill operations.
4. Technological Review
   - Investigate available and emerging technologies for methane capture and utilization.
5. Implementation Strategies
   - Develop recommendations for practical implementation, including partnerships and funding opportunities.
6. Report Submission

Attachment 9 – Report on Solid Waste Bond Ordinance **– Directive No. 250172 (Resolution No. R-189-25)**

Summary of Request:

1. Review the Solid Waste Bond Ordinance
    - Conduct a comprehensive analysis of the existing ordinance to assess its current structure, effectiveness, and compliance with relevant regulations.
2. Provide Recommendations for Restructuring or Reformulation
    - Develop proposals for modifications to improve efficiency, financial sustainability, and operational effectiveness.
3. Evaluate the Defeasance of Outstanding Bonds
    - Analyze financial implications, feasibility, and potential impact of bond defeasance to ensure alignment with municipal fiscal policies.
4. Undertake Necessary Actions to Accomplish the Purpose
    - Identify and implement steps required to achieve the objectives outlined in Resolution No. R-189-25, including stakeholder engagement and regulatory coordination.
5. Submit a Final Report
    - Prepare and present a detailed report summarizing findings, proposed actions, and anticipated outcomes for review and further decision-making.

Attachment 10 – Report on Regarding New Technologies Available for the County's West Transfer Station Facility **– Directive No. 250166**

Summary of Request:

1. Explore and identify new technologies available for the County's West Transfer Station (WTS) facility.
2. Examine potential implementation timelines for new and emerging technologies.

Attachment 11 – Report on Closed Loop Recycling at Miami International Airport and PortMiami **– Directive No. 250222 (Resolution No. R-193-25)**

Summary of Request:

1. Explore, evaluate, and develop a closed loop recycling system for Miami Dade Aviation Department ("MDAD") and PortMiami.
2. Identify cost-effective methods for recycling and composting.
3. Consider funding sources, including any applicable grants, for implementing the closed loop

recycling plan, and potential markets for recycled markets.

Attachment 12 – Report on Recycling Outreach and Education Efforts between Miami-Dade County and Miami-Dade County Public Schools - **Directive No. 250196 (Resolution No. R-187-25)**

Summary of Request:

1. Collaborate with Miami-Dade County Public Schools ("MDCPS") to develop a curriculum to educate HeadStart, Pre-kindergarten, Kindergarten, and First Grade students on the importance of recycling.
2. Enter an interlocal agreement or education compact with MDCPS, if necessary.
3. Report on collaborative efforts between DSWM and MDCPS.

Update on Zero Waste Master Plan and Waste Diversion

The Department has had a long history of providing waste diversion resources to its customers. Beginning in 1990, DSWM launched its curbside recycling program to divert recyclable materials to beneficial use. The County built on this waste diversion effort in 1993 by requiring commercial entities to recycle at least three waste streams. These two actions prioritized the sustainable treatment of solid waste and emphasized the importance of diverting waste from disposal and towards beneficial use.

As Miami-Dade County has grown, so have DSWM's efforts to divert waste from disposal. DSWM customers can recycle electronic waste, appliances, tires, used oil and chemicals, and yard waste at county trash and recycling centers. In 2014, the Solid Waste Advisory Committee (SWAC) provided additional steps to build on these diversion efforts to be taken as part of the Department's waste diversion efforts and as part of the Solid Waste Master Plan. Recommendations included encouraging home composting of organic waste materials, providing more residential enforcement of solid waste rules, and expanding recyclables accepted by the curbside recycling program. DSWM built on these recommendations by starting a Home Composting Program, enforcing recycling contamination through an outreach and education campaign, and adding additional recyclables to the curbside recycling program.

Although Miami-Dade County has been dedicated to waste diversion for decades, discussions surrounding zero waste goals didn't begin until 2021. As Mayor In 2022, I proposed Miami-Dade County becoming a Zero Waste County and solicited feedback from the community. In 2023, DSWM's Bond Engineer drafted a report detailing some measures that the County and Department would need to incorporate to begin working towards becoming a Zero Waste County. In 2024, a Request for Proposal (RFP) was drafted and advertised to hire a consultant to develop a Zero Waste Master Plan in collaboration with Miami-Dade County. The Zero Waste Master Plan, in coordination with the County, is expected to be completed in 2026.

The Zero Waste Master Plan (ZWMP) will be categorized into short-term, medium-term, and long-term timelines for accomplishing the goals outlined in the Plan. The ZWMP will include recommendations on policy changes, new programs, and required infrastructure to put the County on the path to becoming a Zero Waste County. The ZWMP will include policy recommendations for promoting reuse to help limit waste generation, recommendations for optimizing the ongoing recycling efforts in the County, policy and infrastructure required to process organic waste, in addition to other relevant policies, programs, and infrastructure. Stakeholders will be invited to participate and provide feedback on the ZWMP beginning in the Summer of 2025 to ensure that the ZWMP reflects community input and includes subject matter expertise. The ZWMP will build on existing waste diversion efforts and ensure Miami-Dade County is a sustainable and future-ready County.

Conclusion

This is a comprehensive report in detail and we look forward to the Board's feedback. Our goal is to create a sustainable, efficient, and cost-effective solid waste management system that meets the needs of our community while protecting our taxpayers and our environment for future generations.

In accordance with Ordinance No. 14-65, this report will be placed on the next available Board meeting agenda, without committee review. If additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

Attachment

c: Geri Bonzon-Keenan, County Attorney
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ATTACHMENT 1 & 2 (Combined Report)

Directive 250538: Comprehensive Review and Analysis of Waste Management Strategies

Directive 250174: Report to Request and Receive Certain Information from the Design Criteria Professional

Memorandum

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on Market Research on All Solid Waste Management Methods, Waste-to-Energy (WTE) Financing/Procurement Options, and Federal, State, and Local Funding Options; Develop and Present an Alternative Solid Waste Management Plan – Directives No. 250538 and No. 250174

Executive Summary

On February 19, 2025, the Board of County Commissioners ("Board") approved Resolution No. 198-25, sponsored by Chairman Anthony Rodriguez and Commissioner Juan Carlos Bermudez and Resolution No. 190-25 ("Resolutions") sponsored by Commissioner Raquel Regalado, respectively. The Resolutions directed the County Mayor or County Mayor's designee to undertake a comprehensive review and analysis involving industry experts from all available sectors of waste management to further explore the feasibility of constructing a new Waste-to-Energy (WTE) facility; to solicit information and technical advice from waste management industry experts on the best available delivery options and recommended procurement approaches for the design, construction, operation and/or maintenance of a new WTE facility; to explore all waste disposal methods and explore and analyze funding sources and technologies to defray costs of the County's solid waste system including any construction, operation, and maintenance costs associated with a solid waste campus, WTE facility, or landfill expansion.

During the process of compiling this report, staff went to great lengths to receive as much input as possible from industry sources, as directed by the Board. It is important to point out that, as detailed below, despite staff's repeated efforts to follow up with industry respondents to receive specific answers to key information, some answers were not provided including siting and cost information. The administration's recommendation regarding the siting of a solid waste campus remains the same following this report as outlined in the January 2025 memo: that we continue to long-haul waste via truck and rail using our contracted capacity, while we continue exploring options to build a landfill outside of Miami-Dade County.

The market research effort provided the following information requested from the Board's Resolutions:

1) No respondent firms provided specific siting details or offered their own property details to implement their waste solutions. Several firms suggested to utilize County provided properties with lease arrangements.
2) Several firms did express interest in a Public-Private Partnership (P3) model with private financing for permitting, design, construct, and operate/maintain with their waste solutions, including WTE. County compensation will be in a form of per ton fee. Depending on the P3 model, legal guidance will be needed to verify for any flow control encumbrance.
3) Two of six WTE respondents formulated a consortium of companies with expertise and experience to deliver their waste solutions.
4) Federal IRA funding opportunities for WTE were identified but there are current Congressional changes pending that may affect availability.

5) The Market Research Report prepared by AtkinsRéalis reviewed the 38 respondents' waste solutions for cost, current technology deployed in a U.S. based operations, and implementation time frames (if the respondent firm(s) had provided the sufficient information).
6) Alternative Solid Waste Planning roadmap provides three ten-year phases of recommended solid waste initiatives for consideration.
7) Waste solutions summary below for consideration and further evaluation provides the seven separate or parallel paths with tons per year, cost factors, 3P interests, and timeline.

Waste Solutions	Tons per Year	Operating Cost per Ton	CAPEX	Timeline	3P Interests	Additional Cost
County Landfill Optimization (NDL and SDL)	570,000	$ 78.50	$70.4M - $131.9M	>= 5 years	NA	
No County Landfill Optimization (3rd Party Landfills only) and build Transfer Station	2.1M - 3.5M	$ 97.79	$50M	>= 5 years	NA	
Out of County Landfill Development and Rail (Arcadis)	3,000,000	$ 147.67	$2.51B - $2.73B	10 years	NO	
Waste to Energy (WTE)	1,300,000	$45 - $75	$1.5B -$1.9B	7-10 years	YES	Ash Disposal not included
Materials Recovery and Recycling	60K -1M	$40-$100	$60M - $140M	2-5 years	YES	Residue disposal Costs not included
Organic Waste (Composting, Anaerobic Digestion)	2K-1M	$4 - $50	$10-15M	0.5-5 years	YES	Residue disposal Costs not included
Advanced Thermal Conversion	55K - 1.5M	$16 - $420	$25M - 1.5B	0.5-3.5 years	NO	Residue disposal Costs not included

Background

Miami-Dade County (MDC) provides an integrated waste management system with residential collection services of garbage and recycling for over 350,000 households. It operates 13 Trash and Recycling Centers, three (3) transfer stations, two (2) home chemical centers and two (2) landfills. MDC generates over five (5) million tons of waste annually, of which the Department of Solid Waste Management (DSWM) manages over two (2) million tons. Prior to 2023, the Resource Recovery Facility (RRF) processed 48% of the waste, while 22% of the waste was delivered to the South Dade Landfill and 14% to the North Dade Landfill. Approximately 84% of two (2) million tons of solid waste was managed within the MDC owned disposal facilities, and the remaining 16% of the waste was managed using third party disposal facilities. With the loss of RRF, over 50% of the waste is now managed at third party disposal facilities.

In order to comply with the Board's resolution No. R-198-25, a "Market Research" questionnaire was sent to over 125 firms (Exhibit 2.1). The questionnaire requested information on categories including Waste Management Solutions, Financial Approach, Implementation Approach, and Other Information/Advice. Responses were evaluated for scalability and whether they were proven solid waste solutions along with cost factors. For Resolution No. R-190-25, an Alternative Solid Waste Plan has been prepared by AtkinsRéalis to establish a preliminary solid waste solutions road map in three ten-year phases that includes future MDC diversion strategies and disposal needs. AtkinsRéalis prepared the Market Research Report to meet the Board's Resolutions No. R-198-25 and No. R-190-25 requirements (Exhibit 2.2, linked).

The Market Research questionnaire (Exhibit 2.1) was sent to over 125 firms on March 7, 2025, with a response due date of April 14, 2025. There were 38 firms who submitted responses; each response

was categorized into seven technology groups for purposes of comparison. Below is a list of respondent firms that submitted responses to the questionnaire:

Technology Category	Number of Firms	Name of Firms
Waste to Energy (WTE)	6	FCC Environmental Services (FCC), Florida Power & Light (FPL), Insoftel/Synergy, Giant Green Leaf, Frontline Waste, WEF Innovations
Landfill/Disposal	5	Waste Management, Waste Connections, GFL, EnCAP-IT, Environmental Protection & Improvement (EPIC)
Material Recovery	10	Encina, Goldfinch, Juno Technologies, RePower South, Gravitas Infinitum, AMP Robotics, Upland Road, Novastus, EcoPods, Fetch Waste Solutions
Compost/ Anaerobic Digestion	4	Sustainable Generation, Orlando Bioenergy, Your Soilmate, Envision Holding
Advanced Thermal Conversion	7	Bradam Engeries, Tritor Energy, Spartan Holdings, C6 Energy Services, Wastaway, TECAM/BFS Spectrum, Global Guard Technologies/INTEC
Alternative Technology	4	Cambridge Project Development, Green Energy Solutions, Skyscraper Farm, Scrapp
Single Solution	2	Recycling Equipment Solutions, EcoCa

A “Strengths, Weakness, Opportunities, and Threats” (SWOT) analysis was completed for each firm’s response to the Market Research questionnaire. The SWOT Summary by technology grouping provides comparative information about each firm’s response. Please note that the completeness of the submittal to the questionnaire varies from firm to firm. One of the factors considered was whether the proposed solid waste solution is currently deployed within the U.S.

Waste to Energy Respondents Summary

For the six (6) WTE technology respondents, none of the firms provided a physical location for the facility on property that they controlled or recommended a location on property owned by the County. FPL and FCC provided a campus concept that included multiple solid waste solutions to manage over 1.5 million tons of solid waste annually. The FPL response included WTE and anaerobic digestion with composting while the FCC response included WTE, construction and demolition debris recycling, material recovery, and composting. FPL and FCC both responded with a consortium of partners with expertise and experience to design, construct, and operate/maintain the WTE campus concept. Both FPL and FCC responses suggested private financing for the Capital costs and would charge a tipping fee to the County in accordance with a Public Private Partnership (P3) financing model. FPL proposed leasing 40 to 60 acres from the County for their proposed campus. FCC has proposed both options of either utilizing their land or utilizing 50-80 acres of County property. In addition, the FCC suggested revenue share opportunities with the County from electricity generation, recycling, and recovered material sales. FPL would manage the revenue with the intent to provide the County a reduced tipping fee.

Insoftel/Synergy responded with refuse-derived fuel (RDF) processing for a WTE solution. Insoftel/Synergy did not provide a current operation in the U.S. as proposed. The system is modular but can scale up to 1.5 million tons per year at its full capacity, which requires 99 acres. The other three WTE technology respondents provided modular system approaches with expansions to scale up

tonnage processing over time or provide equipment to a WTE solution. Below is the SWOT summary of respondents (AtkinsRéalis Market Research Report Table 1.2-1 page 14):

Waste-to-Energy	Throughput (TPD & TPY)	Acreage Required	Capital Cost ($)	Timeline (years)	Staff Required	Operating Cost ($/ton)
FCC, MasTec, Babcock & Wilcox (B&W) (Operating in US)	1,000,000 TPY - WTE 550,000 TPY - Bulk & C&D Waste Recycling 150,000 TPY Composting 60,000 TPY - MRF Recycling 600K TPY - Landfill	50 to 80 Acres for EcoPark	WTE - $1,500M to $1,900M Bulk & C&D Waste Recycling - $40M to $60M Composting - $10M to $15M MRF Recycling - $60M to Landfilling - $100M (per existing agreement) (see table 5.1-2 for estimates)	The EcoPark will take approximately 4 to 8 years Permitting - 1 to 3 years Design-build – 3 to 5 years Operations - 25 to 30 years WTE - 3 to 5 years MRF - 2 to 4 years Bulk Facility - 2 to 4 years Composting - 2 to 4 years	200+ employees to fully staff the EcoPark	WTE - $45 to $75/ton Bulk & C&D Waste Recycle - $40 to $60/ton Composting - $35 to $50/ton MRF Recycle - $60 to $100/ton Landfilling (Per existing agreement) (see table 5.1-2 for estimates)
WEF Innovations (No current US Operations)	Not provided.	Not provided.	Not provided.	Not provided.	Not provided.	Not provided.
Insoftel - Synergy Conversion Solutions (No current US Operations)	4409 TPD of municipal solid waste (MSW) (1,609,375 TPY) 790,625 TPY to Landfill	~ 99 Acres	Waste-to-Energy facility is between $1.625 to $2.1 billion USD	Schedule based on Modular expansion: 25% operational capacity - Year 2 50% operational capacity - Year 3 75% operational capacity - Year 4 Full operational capacity - Year 6	90+ direct jobs, including 20+ highly trained technicians	Annual maintenance expenditures are projected at approximately $35 million USD; $22/ton
Florida Power & Light (FPL), Kanadevia Inova,	The overall solution offered is for 2.4M TPY -1,300,000 TPY to WTE	40 to 60 Acres	Per FPL, the county's cost estimates for the identified sites are within	Development of a new WTE facility typically occurs over a 7 to 10-year timeframe contingent	The new WTE facility will employ between 90 and 110	Based on FPL's industry experience, the county's cost estimates for the

Waste-to-Energy	Throughput (TPD & TPY)	Acreage Required	Capital Cost ($)	Timeline (years)	Staff Required	Operating Cost ($/ton)
ReWorld Holding Corp., CDM Smith Inc. (Existing US Operations)	-180,000 TPY - Anaerobic digestion w/composting -600K TPY going to Landfill.		industry standards and align with projections previously provided by the county's experts. FPL did not provide separate cost estimates. (See table in Section 5.1.1.4)	upon several key milestones.	highly skilled employees in supporting long-term operational and maintenance requirements.	identified sites align with projections previously provided by the county's experts. FPL did not provide separate cost estimates. (See table in Section 5.1.1.4)
Frontline Waste (No current US Operations)	Modular, slow-pyrolysis waste-to-energy systems Smaller-scale (10K TPY) for under $4M as a pilot (the JF20 System) and could eventually be scaled up to divert between 300K tons and 450K tons of non-recyclable plastics, paper, green biomass waste per year	Not provided.	The total deployed CapEx cost would be between $70M to $120M for 10 to 15 JF60 Systems depending on actual waste tonnages.	Full deployment of these modular systems would occur within 36 months, depending on a phased approach, as each system has estimated 12 months build time.	Not provided.	Not provided.
Giant Green Leaf (Evergreen Technology) - (Pilot plant in Manitoba, Canada; No US operations cited.)	Waste-to-Energy 6 modules - 401,500 TPY. 18-22 modules - I 1,998,000 TPY Landfill – approx. ,400,000 TPY	401,500 TPY - ~12 acres 1,998,000 TPY - ~ 28-37 acres	For a single 570MM UWTE facility (6-module system): ~USD $306.43 million	Feasibility & Site Selection - 6 months Permitting 6 to 9 months Design and Engineering - 4 to 6 months – Parallel with Permitting Construction 12-18 months Commissioning and Start-up 2-3 months Total time to operation 24-36 months	Operation of the plant will support 60 personnel,	System maintenance and support is estimated at $8.3 million per year + $6.7 M for personnel, total 15 M USD: $38/ton

Federal Tax Credit Opportunities under the Inflation Reduction Act (IRA) eligibility guidelines are provided in Appendix C of the Market Research Report prepared by AtkinsRéalis (Exhibit 2.2, linked). If the County maintains ownership of the WTE facility, the potential opportunity in Clean Energy Investment Tax Credits (CE-ITC) could be up to $535 million if all program guidelines are met. The CE-ITC funding would be awarded after the facility is constructed and operational. Please note that the

Federal Tax Credits may be available provided no legislative changes are enacted by the current Administration and Congress. Recently, the United States Congress passed House Bill H.R.1, which removed elements of WTE IRA funding eligibility, and it is now pending Senate approval.

Landfill/Disposal Respondents Summary

There are five (5) respondents in the landfill and disposal category who offer various out-of-county rail transportation and landfill disposal services. Waste Management and Waste Connections have existing landfill assets in Florida and existing disposal agreements with the County. Waste Management also included an out-of-county composting option. EnCAP-IT offered engineering services to expand the County's existing landfills. Synagro (EPIC) offered rail and out-of-county landfill disposal services utilizing their existing disposal agreements but did not provide pricing. GFL included an undisclosed out-of-county landfill asset in the State of Florida that could be operational in the near future and that they could n provide rail, recycling, and disposal services to the County. GFL provided feedback to the Mayor's memorandum recommendation of developing an out-of-county landfill with rail access. GFL stated that their firm has the landfill disposal capacity to meet the County's needs, and the County would not need to invest and develop its own rail and out-of-county landfill infrastructure. Below is the SWOT summary of respondents (AtkinsRéalis Market Research Report Table 1.2-2 page 19):

Landfilling and Disposal	Throughput (tons/hr.) & (TPY)	Acreage Required	Capital Cost ($)	Timeline	Staff Required	Operating Costs ($/ton)
Waste Management Inc. (Current US Operations)	Current Agreement – Up to 2,000,000 TPY at Okeechobee and 700,000 TPY at Medley Landfill. Additional Capability – 1,000,000+ TPY as needed. Options are available for organic processing, composting, and single-stream recycling	All infrastructure in place for current and future disposal capacity.	None. All capital costs to relocate intermodal facility to be borne by WM.	6 months to acquire additional waste containers	Not provided.	Existing contract rates established (See Table 1.1-1 on Page 11)

Landfilling and Disposal	Throughput (tons/hr.) & (TPY)	Acreage Required	Capital Cost ($)	Timeline	Staff Required	Operating Costs ($/ton)
Waste Connections Florida (Current US Operations)	Current Agreement - up to 312,000 TPY with ability to increase capacity Material sorting	All infrastructure in place for landfill current and future capacity. Rail extension to landfill and spur at Rail yard being constructed.	None. All Capital Costs to be borne by WCF.	Not provided.	Not provided.	Existing contract rates established (See Table 1.1-1 on Page 11)
EnCAP-IT (Developed solutions for US clients)	Not provided. Extending airspace capacity at North Dade and South Dade Landfills	N/A	Not provided.	Not provided.	Not provided.	Not provided.
Synagro (EPIC) (Current US Operations)	Rail transport company - can transport any amount Minimum quantity 350,000 TPY	Not required except for setting up rail spur	Cost not provided Private or P3 funding options	9 months	County staff not required	Not provided.
GFL Environmental (Current US Operations)	"GFL anticipates having a disposal option for MD that will meet the needs of MD." Options available for composting, recycling and landfilling	Not provided	Not provided. Private funding	Not provided.	Not provided.	$70-75 / ton

Materials Recovery Respondents Summary

There are ten (10) respondents in the material recovery and recycling category. Each offered various processing technologies to sort mixed waste and recover targeted recyclables for commodity sales or further processing into marketable fuel. Respondents offered a scale-up approach to process more tons of waste over time to meet the County diversion needs. Responses included private funding with the County committing to waste volume and being charged a tipping fee per ton. Several responses included public-private partnership models. AMP Robotics, Juno Technologies, Novastus, and Fetch Waste Solutions have existing U.S.-based operations with sorting capabilities to recover targeted recyclables, and residues are processed through anaerobic digestors to recover biogas for renewable natural gas (RNG) sales. Respondents did not provide siting recommendations for their solid waste solution. Below is the SWOT summary of respondents (AtkinsRéalis Market Research Report Table 1.2-3 page 22):

Materials Recovery and Recycling	Throughput	Acreage Required	Capital Cost ($)	Timeline (years)	Staff Required	Operating Costs ($/ton)
Encina (No current US Operations)	Dirty MRF, waste sorting with waste plastic recycling, can process up to 500,000 TPY	4-5 acres	Not provided.	3-5 years	Not provided. Ops mostly by Encina	Not provided.
Goldfinch (Developing facility in Georgia for 2026)	3,091 TPY	15 acres	Not provided Private funding model	3 years	40	Not provided.
Juno Technology (Current US Operations)	1,100 TPD option to triple capacity with second module waste sorting/anaerobic digestion	30 acres	$325-$400 M private funding model	3 years	75	$20-25M per year
RePower South (Current US Operations)	Dirty MRF, waste sorting, can process up to 500,000 TPY	Not provided, but likely 4-5 acres	Not provided.	3-7 years	Not provided, operation mostly by Repower	Not provided.
Gravitas Infinitum (Carbotura) (No current US Operations)	400 to 4,000 TPD 100% landfilling or 100% material recovery and recycling	3 acres per 100 TPD of capacity	$200-2,0000MM - payment & waste guarantees required	24 months	Not provided.	Fee-based revenue model
AMP Robotics (Current US Operations)	25 tons/hr. per module landfill and recycling	Depending on the agreed quantity of waste to be processed	Not provided Public or private funding model	30 months	Not provided.	Not provided.
Upland Road (No current US Operations)	2,000 – 2,400 TPD material recovery and recycling	150 acres plus 15 acres for recycled paper mill if adopted	$2750M P3 development opportunity	36 months Phase 1 48 months Phase 2	300	$425 - $450 M per year Tipping Fee: $65 - $75/ton
Novastus (Current US Operations)	1,920 TPD material recovery and solid fuel conversion for transport to PC boiler	5 acres plus storage	$90 M option for public or private funding	36 months	22	$70/ton public ownership option
EcoPods Miami (Pilot-scale US Operations)	pilot scale modular - novel technology sorting/anaerobic digestion to produce synfuel	< 1 acre per module co-located at existing landfills	$5M per module staged P3 financing option	5 years for scaled up facility	Not provided.	Not provided.
Fetch Waste Solutions (Operating in Ohio, USA)	400,000 to 1,000,000 TPY mixed waste processing	6 acres plus storage/handling	$140M for 1M ton per year private funding	24 months	Up to 90	$40-50 per ton plus 20% of recyclables

Composting and Anaerobic Digestion Respondents Summary

There are four (4) respondents with composting and anaerobic digestion technology. The feedstock would require sources of separated or pre-sorted organics (food waste and green waste) from material recovery processors, as mentioned in the previous section. The anaerobic digestion process would produce marketable fuel. Development of end markets is key for compost products for this solid waste solution, preferably local buyers, as transportation would add significant costs for compost products sold. Lastly, this solid waste solution offering does not address the scale and waste mix disposal needs of the County. All four respondents stated that they have a U.S.-based operations. Soilmate has a Miami-based operation. Other respondents did not provide siting recommendations for their solid waste solution. Below is the SWOT summary of respondents (AtkinsRéalis Market Research Report Table 1.2-4 page 25):

Organic Waste, Composting, Anaerobic Digestion	Throughput (tph) (TPY)	Acreage Required	Cost ($)	Timeline (years)	Staff Required	Operating Costs ($/ton)
Sustainable Generation (Existing US Operations)	Scalable	4-5 acres but will depend upon organic waste quantity to be composted	Not provided.	Not provided.	Not provided.	Not provided.
Orlando Bioenergy (Project development in Orlando and North Carolina)	500,000 to 1,000,000 TPY organic materials	20 acres	$100M Private Funding	3.5 years	Not provided.	Not provided.
Your Soilmate (Existing Service in Miami)	500 gal/week [approx. 37 tons per week] pick up and composting	7 acres	Private Funding	0.5 year	Not provided.	$592/month [approx. $4/ton]
Envisions Holding (Existing US Operations)	130,000 TPY mixed organics composting	30 acres [estimated from Everett, WA facility using Google Earth]	Private Funding	1 year	Not provided.	Not provided.

Advanced Thermal Conversion Respondents Summary

There are seven (7) respondents in the advanced thermal conversion technology category. These types of solid waste solutions require specific feedstock for processing into marketable energy sales. The advanced thermal conversion category can be part of an overall solid waste system as they are limited in scale and require specific feedstock. Respondents did not provide siting recommendations for their solid waste solution. Spartan Holdings & Wastaway have existing US operations. Bradam Energies is developing projects in the US. C6 Energy Services has operations in many countries worldwide. The rest do not have any operations in the US. Below is the SWOT summary of respondents (AtkinsRéalis Market Research Report Table 1.2-5 page 27):

Advanced Thermal Conversion	Throughput	Acreage Required	Capital Cost ($)	Timeline (years)	Staff Required	Operating Costs ($/ton)
Bradam Energies (Developing Projects in North America)	Each CER system is a process line @ 12.3 tons/hr.	5 acres for north landfill, 17 acres for south landfill	Not provided. private or P3 funding	6mo. for contract development with MD, 6mo. for permitting, 36 months construction	Bradam responsible for O&M	Not provided.
Tritor Energy (No current US Operations)	600 TPD material sorting, recovery, and RDF production	1.48 acres	$12 million per unit	0.75 year	Not provided.	Not provided.
Spartan Holdings (Existing US Operations)	150 TPD LDPE/plastic pyrolysis to syn fuel or power generation	<1 acre	$25 to $60 million depending on feedstock public or private funding options	1.2 years	10 to 12	Not provided.
C6 Energy Services (Operating in many countries)	2,750 TPD material sorting, option for syn fuel, electricity production	7.41 acres	$1,100 million	Not provided.	Not provided.	$420/ton
Wastaway (Existing US Operations)	15.98 tons/hr.	50,000 sq ft building	Not provided.	24 months	16 hours /day	Not provided.
TECAM / BFS Spectrum Tech (No current US Operations)	30 tons/hr. Thermal treatment plus cogen	4-6 acres	$230 Million process, balance of plant, and civil private and public funding option	Contract to operational in 18-24 months	Two operation personnel required	Not provided.
Globe Guard Technologies / INTEC (No current US Operations)	Syngas production from organic waste 3.3 tons/hr. conditioned waste per reactor, 4200 TPD total for two plants	29.6 acres	$1,518 million at US$1.13/Euro	3.5 years	Not provided.	Not provided.

Alternative Technologies Respondents Summary

There are four (4) respondents in the alternative technology category and two respondents providing single constituent solutions, which include a specific waste type or equipment type for managing solid waste. These systems can be part of an overall solid waste system strategy as they are limited to addressing the scale and waste mix disposal needs of the County. Respondents did not provide siting recommendations for their solid waste solution. None of the respondents have operations in the US. Below is the SWOT summary of respondents (AtkinsRéalis Market Research Report 1.2-6 page 30):

Alternative Technologies	Throughput	Acreage required	Capital Cost ($)	Timeline (years)	Staff Required	Operating Costs ($/ton)
Cambridge Project Development (No current US Operations)	Scalable @ 420 TPD per unit - MSW baling for export	<1 acre	$1M per unit DWM funding	2 years for 12 units	Not provided.	$5/ton plus transport
Green Energy Solutions LLC (No current US Operations)	700 TPD - hybrid with farm 500 TPD standard WTE	Not provided.	$230 M total project cost - hybrid	1.5 years	Not provided.	$72.01/TPY Hybrid w/farm
Skyscraper Farm (No current US Operations)	Not provided.	Not provided	Not provided.	Not provided	Not provided.	Not provided
Scrapp (No current US Operations)	Software solutions	N/A	Not provided.	0.5 year	Not provided.	$150,000 per year

Single Constituent Solutions Respondents Summary

There are two respondents that offer specific equipment for waste solutions. These solutions can be part of the overall solid waste system. Below is the SWOT summary of respondents (AtkinsRéalis Market Research Report Table 1.2-7 page 31):

Single-Constituent Technologies	Throughput	Acreage Required	Cost ($ millions)	Timeline (years)	Staff Required	Operating Cost ($/ton)
Recycling Equipment Solutions Corporation (Existing US Operations)	5000 TPD baling and long-haul	<1 acre	$12-15M	0.5 year	Not provided.	Low
EcoCa (No current US Operations)	1 ton/hr tires only	<1 acre	$4M	Not provided.	Not provided.	Not provided.

Disposal Defray Cost Opportunities

An analysis was conducted to explore defray costs of the County's solid waste system including any construction, operation, and maintenance costs associated with a solid waste campus, WTE facility, or landfill expansion. The current average disposal cost using the County's landfills and third party Disposal Agreements is $78.50/ton (AtkinsRéalis Market Research Report from Table 1.1-1 page 11). If County landfills optimization options are not explored, the future average disposal cost will increase to $97.79/ton (AtkinsRéalis Market Research Report from Table 1.1-2 page 11). Opportunities to defray and stabilize disposal costs are as follows:

Defraying Cost Opportunities	Benchmark Disposal Rates	Duration
County Landfill(s) Optimization SDL – 8 to 10 yrs. Life NDL – 8 to 36 yrs. Life	Extend local disposal capabilities and maintain disposal rate at $78.50/ton	Permit Review and Approval up to 5 yrs.
Evaluate WTE Solutions with P3 Partnerships	Disposal rate less than $97.79/ton	Development schedule is 7 to 10 yrs. Site Selection Dependent
Evaluate Solid Waste Diversion Solutions	Processing/Diversion rates less than $78.50/ton	Development 3 to 5 yrs
Implement ZWMP Master Plan	Reduce waste generation rates.	Plan Implementation 2 to 5 Years.

The Current Disposal Agreements with the two private vendors have two 10-year options to renew with either party having the option to terminate the Agreement. Any proven technologies to divert landfill disposal volume below the benchmark disposal rate will help defray or stabilize disposal costs.

Waste Solutions	Tons per Year	Operating Cost per Ton	CAPEX	Timeline	3P Interests	Additional Cost
County Landfill Optimization (NDL and SDL)	570,000	$ 78.50	$70.4M - $131.9M	>= 5 years	NA	
No County Landfill Optimization (3rd Party Landfills only) and build Transfer Station	2.1M - 3.5M	$ 97.79	$50M	>= 5 years	NA	
Out of County Landfill Development and Rail (Arcadis)	3,000,000	$ 147.67	$2.51B - $2.73B	10 years	NO	
Waste to Energy (WTE)	1,300,000	$45 - $75	$1.5B -$1.9B	7-10 years	YES	Ash Disposal not included
Materials Recovery and Recycling	60K -1M	$40-$100	$60M - $140M	2-5 years	YES	Residue disposal Costs not included
Organic Waste (Composting, Anaerobic Digestion)	2K-1M	$4 - $50	$10-15M	0.5-5 years	YES	Residue disposal Costs not included
Advanced Thermal Conversion	55K - 1.5M	$16 - $420	$25M - 1.5B	0.5-3.5 years	NO	Residue disposal Costs not included

Per Ordinance No. 14-65, this memorandum will be placed on the next available Board meeting agenda, without committee review. Should you have any questions or if additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

Attachments:
Exhibit 2.1 – Market Research Questionnaire
Exhibit 2.2 (linked) – AtkinsRéalis Market Research Report

c. Geri Bonzon-Keenan, County Attorney
Gerald Sanchez, First Assistant County Attorney
Jess McCarty, Executive Assistant County Attorney
Office of the Mayor Senior Staff
Aneisha Daniel, PhD, Director, Department of Solid Waste Management
Yinka Majekodunmi, Commission Auditor

Basia Pruna, Director, Clerk of the Board
Eugene Love, Agenda Coordinator
Office of Policy and Budgetary Affairs

Exhibit 2.1

Market Research Questionnaire

EXHIBIT 2.1

MARKET RESEARCH FOR MUNICIPAL SOLID WASTE MANAGEMENT SOLUTIONS

Background

Miami-Dade County ("County") provides an integrated waste management system that provides collection, transfer, and disposal services to include landfills and historically included a waste-to-energy facility. The County's Department of Solid Waste Management (DSWM) provides waste collection services twice a week to more than 350,000 households in a 320-square-mile waste collection service area. DSWM operates 13 Neighborhood Trash and Recycling Centers and administers the contracted collection of household recyclables. Historically, the County produces over five million tons of waste annually, of which DSWM disposal system processes more than 2.4 million tons.

Objective

The County is conducting market research to garner industry comments and solutions regarding potential future projects for a comprehensive solid waste management approach. This effort is being undertaken by the County as part of a review and analysis to further explore all available delivery methods for the disposal of waste. Various items related to solid waste management were discussed by the Board of County Commissioners on February 19, 2025 and the agenda to such meeting can be accessed using the following link.

https://www.miamidade.gov/govaction/commminute.asp?cmbmeetdate=5227&file=false

The County is particularly interested in responses to this market research from industry experts from all available sectors of waste management. The requested information will assist the County to better understand the marketplace, gather information regarding the current state of the industry, and gauge interest in the projects and may also be used by the County for any other purpose.

Public Record

Respondents are hereby notified that all information submitted as part of, or in support of, this analysis will be available for public inspection in compliance with Chapter 119, Florida Statutes, popularly known as the "Public Record Law." Accordingly, do not submit any information in response to this analysis which the respondent considers to be a trade secret, proprietary or confidential, is competitively sensitive, or which violates any intellectual rights of a third party.

Responses

Responses should address the requested information below and indicate "not applicable" when a particular item cannot or will not be addressed by respondent. Responses should be submitted to the County's contact person indicated below via email no later than **April 14, 2025**.

Email to:
Saba Musleh, CPPB, Negotiator
Strategic Procurement Department
saba.musleh@miamidade.gov

With a copy to (CC line of email):
Ross Byers, Project Manager
AtkinsRéalis
ross.byers@atkinsrealis.com

Respondents are encouraged to not limit their responses to any already-identified potential sites, locations, or assumptions as to the size or capacity of the respondent's solution. Respondents are encouraged to consider any combination of waste disposal methods such as, but not limited to, waste-to-energy, landfills, or hauling waste.

Requested Information

A. Respondent

Provide a brief summary of the respondent to include the following.

2. Funding Model - Identify the funding model for the respondent's solution and whether respondent would provide financing for such solution. Indicate the arrangements for the funding and financing (e.g., public private partnership, private-funded, County-funded, financing, federal tax credits, and federal and state grants, etc.).

3. Revenue - Describe the potential revenue streams from the respondent's solution (e.g., energy production, material recovery, tax credits, sale of products, etc.).

D. Implementation Approach

1. Infrastructure - Describe the infrastructure requirements necessary to implement the respondent's solution and the role the respondent would fulfill in such implementation. (i.e., master developer, design/builder, operator, technology provider, etc.).

2. Size - Identify the recommended site, including any identifiable site information, and footprint of the site that will be necessary to implement the respondent's solution.

3. Site Ownership - Describe the respondent's plan to secure the recommended site to implement the respondent's solution, including any zoning or re-zoning requirements. Identify the current owner of the site.

4. Permitting - Describe any necessary permitting or regulatory processes necessary to implement the respondent's solution.

5. Timing - Identify the estimated timeframe for the implementation of the respondent's solution.

6. O&M - Describe the anticipated operational and maintenance requirements and needs for the operational phase of the respondent's solution.

7. Health/Safety/Environmental - Describe how the respondent's solution protects both human health and the environment and any anticipated environmental impacts of the respondent's solution (e.g., emissions, noise, odor, etc.).

E. Other Information/Advice

1. Procurement Model - Provide respondent's advice as an industry expert regarding the recommended procurement approach for the design, construction, operation and/or maintenance of a new facility such as a waste-to-energy facility, or any alternative solution, for the County such as traditional methods (e.g., design-build or design-bid-build) and alternative delivery methods (e.g., public private partnership).

2. Partnerships – Identify if respondent as an industry expert has any other advice such as constructing a larger regional waste-to-energy facility with other local governments or the State of Florida or building a smaller facility combined with utilizing other waste disposal methods such as landfills or hauling waste.

3. Additional Insights - Provide any additional insights or advice as an industry expert that the respondent believes would be helpful for the County to know.

ATTACHMENT 3

Directive 250299: Report to Assess and Evaluate the County's Landfill Capacity

Memorandum

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on Miami-Dade County's Landfill Capacity and Viable Options for Expansion - Directive No. 250299

Executive Summary

On February 19, 2025, the Board of County Commissioners ("Board") approved Resolution No. R-196-25 ("Resolution"), sponsored by Commissioner Juan Carlos Bermudez, directing the County Mayor or County Mayor's designee to assess and evaluate the landfill capacity at all Miami-Dade County (the "County") landfills; determine if it is the best interest of the County to expand its landfill capacity, and the viability of such expansion of any or all of the County's landfills including a breakdown of savings/costs for any proposed expansion, analysis of the impact to each municipality based upon predicted tonnage, as well as options for methane extraction, public-private partnership, and potential reuse of certain landfill materials; perform a cost/savings analysis of options for such expansion; and prepare a report detailing the foregoing for Board consideration. Commissioner Bermudez additionally requested information regarding the department's plans for the application of odor controlling chemicals at the County's Landfills as a supplemental verbal directive to Resolution No. R-868-24 (Directive No. 241482), which was approved by the Board on October 1, 2024. This report addresses this request.

A supplement to this item, as requested by Commissioner Raquel A. Regalado, includes information regarding options for financial public/private partnerships for the County's landfills and re-using decommissioned landfills for development.

Information on options for methane extraction can be found in the accompanying report titled "Methane Gas Extraction at Existing Miami-Dade County Landfills - Directive No. 250224" which outlines various strategies and methods for effectively extracting methane from landfills within the County.

Reference to Directive 250208 and memorandum Out of County Landfill Development with Rail, the financial estimates for capital and projected operating cost are higher than optimizing existing County's landfill with a project timeline projected to be ten years to obtain regulatory approvals and construction. Below is summary of comparable costs from the Directive 250208.

	Cost per Ton	Capital	Regulatory Timeline
Current Landfill Costs with Optimization	$78.50	$78.50M - $131.9M	>= 5 years
3rd Party Disposal Only (MDC Landfills closed)	$97.79	$50M	>= 5 years
Out of County New Landfill with Rail	$147.67	$2.51B - $2.73B	>= 10 years

Background

The County owns and operates three landfills to serve the waste disposal needs within the County. The North Dade Landfill (NDL) is permitted to accept Class III waste types, which include yard waste,

construction and demolition debris, processed tire chips, asbestos, carpet, cardboard, paper, glass, plastic, furniture other than appliances, or other materials approved by the Department of Solid Waste Management ("DSWM") that are not expected to produce leachate. The South Dade Landfill (SDL) is permitted to accept Class I waste types, which include non-hazardous solid waste and that is not prohibited from disposal in a lined landfill under rule 62-701.300, F.A.C. The former Resources Recovery Facility (RRF) Ashfill is permitted as part of the Power Siting Act that is approved to accept ash residuals generated from the co-located waste-to-energy plant.

The NDL is permitted to receive Class III-type waste, and consists of two cells, spanning 218 acres; 180 acres are permitted for waste disposal. The closed West Cell had a disposal area of approximately 96 acres. The active East Cell has a waste disposal area of 84 acres and has an 80-mil thick high-density polyethylene geomembrane (HDPE) bottom liner system. Both cells have an active landfill gas collection system (LFG) connected to the onsite flare.

The SDL is a 320-acre Class I Municipal Solid Waste Landfill that is comprised of five permitted disposal cells. Cells 1 and 2 have approximately 92 acres of combined footprint area and were in use from 1978 with closure activities completed in August 1997. Cells 1 and 2 have an active LFG collection system. Cell 3 covers 46 acres and was in use from 1986 to 2008; closure activities were completed in February 2011. Cells 3 has a leachate collection system and an active LFG collection system that is also connected to the onsite flare. Cell 4 consists of approximately 60 acres and waste placement is close to reaching its permitted capacity. Cell 4 has an active LFG collection system connected to the onsite flare. Cell 5 has 46 acres and is the current active area for waste placement. Cell 5 is permitted for final elevation of 147' NGVD. Cell 5 has a double composite 60-mil thick HDPE geomembrane bottom liner. The LFG system is in placed to collect methane gas from Cells 1-4 that is delivered to the candlestick flare for destruction. Cell 5 LFG is scheduled for installation this year.

The RRF Ashfill is located adjacent to the Miami-Dade County Resource Recovery Facility and has 80 acres divided into 20 cells. Cells 1-19 consists of 61.5 acres that are closed, while Cell 20 has the capacity of 1.1 million tons, with 16 acres remaining. The landfill has not received any ash disposal since February 2023, which is when the waste-to-energy facility sustained a fire that resulted in it being inoperable.

It is a standard best practice in the solid waste industry to optimize existing landfill assets with vertical and/or horizontal expansions to extend landfill asset life. The optimization effort begins with environmental and engineering analysis on existing landfill footprint to support the proposed height of a vertical expansion. In case of horizontal expansion scenarios, evaluation of adjacent land to existing landfill footprint is available to construct new landfill footprint. A proposed landfill expansion will follow the Florida Department of Environmental Protection (FDEP) permitting process along with required public notifications and hearings throughout the permit application process. The estimated time frame to obtain FDEP expansion permits from design and application to permit issuance could range from five to ten years, which includes Federal Aviation Administration (FAA) review or other regulatory agencies. If landfill expansion efforts are pursued for NDL and SDL, upon receipt of regulatory approvals for the optimal vertical and horizontal dimensions will defray 3rd party disposal cost of combined estimated $221.4 million dollars and generate combined net revenue of $389.5 million dollars. Return on capital invested (ROIC) is estimated to be over 200%.

The Landfill Capacity Analysis Report prepared by Arcadis, our Bond Engineer, is included in Exhibit 3.1. The following is the remaining landfill capacity as of October 1, 2024.

	Projected Annual Tons	Projected Life (Years)	Projected Year
North Dade Landfill (Class III)	170,000	5	2029
South Dade Landfill (Class I)	750,000	4	2028
RRF Ashfill	TBD	TBD	TBD

RRF Ashfill

There are approximately 1.2M tons of remaining capacity in Cell 20. The Ashill will have to be closed if the RRF Doral location is not selected for a Solid Waste Sustainability Campus. The available airspace may be utilized for debris generated during plant closure and demolition.

North Dade Landfill (Class III) Optimization and Cost Saving Analysis

North Dade Landfill (Class III) optimization will require further geotechnical and landfill structural analysis to determine the optimal vertical expansion on top of existing permitted landfill footprint. The preliminary analysis with conceptual drawings was prepared by Arcadis in Exhibit 3.2. The vertical optimization scenarios are listed below:

Optimization Description	Additional Life in years	Capital (CIP) Cost (Includes Cell Construction, Gas System, Capping & PC Costs)	Landfill Expansion Net Revenue (Tip Fee Less CIP and Operating Cost)	No Landfill Expansion Haul Out Cost (Tip fee Less Trans. & 3rd Party Disposal Cost)
East Cell 84 Acres +32'	8.6	$33,800,000	$19,274,810	($29,710,187)
East Cell 84 Acres +62'	12.7	$35,200,000	$43,719,810	($44,177,687)
East and West Cell 180 Acres +32'	28	$66,600,000	$107,084,810	($97,225,187)
East and West Cell 180 Acres +62'	36.3	$69,500,000	$155,874,810	($126,160,187)

The above optimization scenarios with financial details are provided in Exhibit 3.3. All four optimization scenarios generate positive net revenue. Moreover, additional landfill capacity will reduce the need for third party transportation and disposal. As part of a landfill approval process, the Federal Aviation Administration (FAA) in 2008, had previously provided approval for a "Determination of No Hazard to Air Navigation" up to elevation 290 feet above mean sea level (AMSL) or a maximum elevation +152' from the current permitted height of 138' (Exhibit 3.4).

Horizontal expansion may also be possible at the North Dade Landfill. An engineering analysis is required to optimize areas to identify available acreage for horizontal expansion consideration.

South Dade Landfill (Class I) Optimization and Cost Saving Analysis

An engineering evaluation at South Dade Landfill (Class I) has confirmed the feasibility of expanding Cells 4 and 5 vertically up to 250' NVGD. A horizontal expansion of a new 18-acre Cell within the

existing landfill property boundary is also feasible. The preliminary optimization evaluation is provided in Exhibit 3.5. The landfill optimization scenarios are listed below:

Optimization Description	Additional Life in years	Capital (CIP) Cost (Includes Cell Construction, Gas System, Capping & PC Costs)	Landfill Expansion Net Revenue (Tip Fee Less CIP and Operating Cost)	No Landfill Expansion Haul Out Cost (Tip fee Less Trans. & 3rd Party Disposal Cost)
Horizontal Expansion (Cell 6) up to 140' NVGD	2.1	$36,600,000	$24,170,099	($20,214,781)
Vertical Expansion (Cells 4 & 5, 106 Acres) +103'	7.8	$25,845,000	$199,586,892	($74,988,466)
Combined Vertical and Horizontal Expansion	10	$62,445,000	$233,627,726	($95,203,248)

Estimated net revenue from a successful SDL combined horizontal and vertical expansion effort is $233M with haul out and disposal cost savings to third party landfills of approximately $95M. The landfill optimization financial analysis is included in Exhibit 3.3.

Financial Impacts to Municipalities with No Landfill Expansions

The current weighted average rate is $78.50 per ton for utilizing existing County landfills and when the County's landfills reach capacity, only utilizing 3rd party disposal contract rate is $97.79 per ton; the weighted Average Out-of-County Disposal Cost will increase by $19.29/ton. The financial cost impacts to municipalities when both SDL and NDL reach current permitted disposal capacity are listed below.

Tonnage Information by Municipality		
Municipalities	**FY 2024 Actuals (Tons)**	**Annual Fiscal Impact (No Landfill Expansion)**
City of Miami	160,356	$3,093,267
City of Miami Beach	8,033	$154,957
City of Coral Gables	9,128	$176,079
City of Homestead	72,164	$1,392,044
City of South Miami	10,194	$196,642
Town of Surfside	6,845	$132,040
Village of Miami Shores	5,095	$98,283

Tonnage Information by Municipality		
Municipalities	**FY 2024 Actuals (Tons)**	**Annual Fiscal Impact (No Landfill Expansion)**
City of Miami Springs	4,078	$78,665
City of North Bay Village	4,448	$85,802
City of West Miami	3,419	$65,953
Bal Harbour Village	27	$521
Village of Biscayne Park	24	$463
Golden Beach	75	$1,447
Hialeah Gardens	16	$309
City of Opa-Locka	346	$6,674
City of Sweetwater	363	$7,002
	284,611	**$5,490,146**

Conclusion

Optimizing existing landfill assets offers the County significant financial advantages, including the avoidance of transportation and disposal costs through third-party landfills and the preservation of revenue generated by the Disposal Fund. The construction of a new transfer station and the associated operating costs can be deferred until all the additional landfill capacity is utilized.

A strong bond rating, facilitated by the expansion initiatives, will enable the County to secure favorable financing terms for future projects, thereby mitigating potential fee increases and ensuring that waste management services remain affordable for residents.

The County's long-term sustainability and operational efficiency of its waste management system will be reinforced through these initiatives, generating additional revenue and supporting fiscal stability, which will in turn facilitate sustained investment in essential services for the community.
With Board approval to proceed with engineering analyses to optimize landfill assets, detail expansion design plans can be developed, and additional expansion airspace can be identified for consideration. Landfill expansion efforts will be subjected to the Florida Department Environmental Protection (FDEP) application review process and community engagement is critical to the success of expansion projects.

Supplemental on Re-using Decommissioned County Landfills for Development

A decommissioned landfill has been completed up to, but not limited to, thirty years of post-closure care period per FDEP 62-701.620 F.A.C. provided in Exhibit 3.6 for reference. FDEP will release the owner of the landfill property from further financial responsibility for environmental monitoring, and the landfill closure permit will be terminated with property deed restrictions to protect the existing landfill cap. The owner can propose development of such property for other uses subjected to local zoning regulations and building codes. Exhibit 3.7 includes examples of reuse of decommissioned landfill property for development which are also highlighted below.

- The Munisport Landfill property (owned by the City of North Miami) where the property was leased to developers for development of new uses that included public park, residential, and

commercial properties. The City receives lease payments, and the developer converts parcels into reusable properties for commerce.

- Virginia Key Landfill (owned by the City of Miami) is developing an end use plan as a public recreation park complex once the landfill closure period is complete.

- Vista View Park (owned by Broward County) was previously a sanitary landfill used for the disposal of municipal solid waste. Current activities in the park include trails for horseback riding, biking, rollerblading, paragliding, primitive camping, radio-controlled plane flying and boating, and other passive activities.

- Dyer Park (owned by Palm Beach County) was a 560-acre sanitary landfill that has been converted into a park with playgrounds, sports fields for soccer, baseball, and softball, biking and hiking trails, and fishing areas.

- Other decommissioned landfill end use examples are included in Exhibit 3.7, Landfill Redevelopment Report prepared by Arcadis.

DSWM owns the 58th St closed landfill that is approaching the end of post closure care period. DSWM staff are working with FDEP to end the closure permit requirements which will allow for end use plan considerations.

Supplemental on Nuisance Odor Mitigation Measures at Landfills

There can be a number of sources of nuisance odors generated from an active modern landfill. One source of nuisance odors can be from the acceptance of solid waste at the working face. The Florida Department of Environmental Protection (FDEP) regulations Chapter 62-701 F.A.C. requires landfill operators to apply six inches daily soil cover or an alternate daily cover to mitigate odors from the working face. Another odor source is uncontrolled landfill gas generated from the decomposition process. The Clean Air Act along with FDEP regulations require landfill operators to install an active gas collection system through a network of underground collection piping with a negative pressure vacuum connected to a flare for destruction or a renewable landfill gas conversion system. For South Dade Landfill (SDL) where Class 1 type waste is received, daily soil cover is applied at the end of each working day or the approved alternate daily cover Posi -shell spray is utilized. There is an existing active landfill gas collection system in place at SDL to control landfill gas odors. In addition, there is a perimeter odor mitigation system with odor neutralizer agent to capture odor within the landfill property. For North Dade Landfill (NDL) is permitted as a Class III landfill accepting only non-putrescible and inert type waste. There is an existing active collection to capture landfill gas. These measures are effective as there have been no odor complaints from nearby receptors. Additional mitigation measures will be added as warranted if off site nuisance odors are detected by our odor patrol observations.

Per Ordinance No. 14-65, this memorandum will be placed on the next available Board meeting agenda. Should you have any questions or if additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

Attachments:
Exhibit 3.1 - Landfill Capacity Analysis Report (Arcadis)
Exhibit 3.2 - NDL Vertical Expansion Scenarios (Arcadis)
Exhibit 3.3 - Landfill Optimization Financial Analysis
Exhibit 3.4 - FAA Determination of No Hazard to Air Navigation

Exhibit 3.5 - SDL Optimization Scenarios (MEC Engineering)
Exhibit 3.6 - FDEP Long-Term Care Section 62-701.620 F.A.C
Exhibit 3.7 - Landfill Redevelopment Report (Arcadis)

c. Geri Bonzon-Keenan, County Attorney
Gerald Sanchez, First Assistant County Attorney
Jess McCarty, Executive Assistant County Attorney
Office of the Mayor Senior Staff
Aneisha Daniel, PhD, Director, Department of Solid Waste Management
Yinka Majekodunmi, Commission Auditor
Basia Pruna, Director, Clerk of the Board
Eugene Love, Agenda Coordinator
Office of Policy and Budgetary Affairs

Exhibit 3.1

Landfill Capacity Analysis Report (Arcadis)

EXHIBIT 3.1

ARCADIS Design & Consultancy for natural and built assets

MIAMI-DADE COUNTY

Miami-Dade County
Department of Solid Waste Management

LANDFILL CAPACITY ANALYSIS FOR DSWM ACTIVE LANDFILLS AS OF JULY 1, 2024

Final Report

November 6, 2024

ARCADIS

LANDFILL CAPACITY ANALYSIS FOR DSWM ACTIVE LANDFILLS AS OF JULY 1, 2024

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Our Ref.:

30229246

Date:

November 6, 2024

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CONTENTS

APPENDICES

TABLES

ACRONYMS AND ABBREVIATIONS

DSWM	Miami-Dade County Department of Solid Waste Management
DTM	Digital Terrain Models
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
MSL	Mean Sea Level
NDLF	North Dade Landfill
RRFAF	Resources Recovery Facility Ashfill
SDLF	South Dade Landfill

EXECUTIVE SUMMARY

Introduction

The Miami-Dade County Department of Solid Waste Management (DSWM) must evaluate the status of its landfills annually to determine the remaining capacity/volume of their existing active landfills and the land permitted for future landfills. Arcadis U.S., Inc. (Arcadis), in the capacity as Bond Engineer, has completed the 2024 landfill capacity analysis, which includes volume calculations for the three DSWM active landfills including North Dade Landfill (NDLF), South Dade Landfill (SDLF), and Resources Recovery Facility Ashfill (RRFAF). These calculations provide remaining volume estimates of the referenced facilities in accordance with the Florida Department of Environmental Protection (FDEP) Florida Administrative Code (F.A.C.) Chapter 62-701.500(13)(c). For its internal auditing purposes, DSWM has also included three months of tonnage information for July through September.

The capacity calculations were performed by comparing the latest topographic survey to the final permitted closure grades using AutoCAD Civil 3D software. Tonnage data for the analysis was provided by DSWM.

North Dade Landfill

As of July 1, 2024, the North Dade Landfill had an available waste capacity of approximately 880,554 tons, which is a decrease of 4.44% from the July 1, 2023 available waste capacity. The decrease in capacity is attributable to additional waste placement. The NDLF accepted 104,498 tons of waste between July 1, 2023 and June 30, 2024, which is a decrease of 31.27% from the previous reporting period. Based on the waste tonnage recorded from inception through June 30, 2024, there is approximately 13,627,578 tons of waste in the NDLF

South Dade Landfill

As of July 1, 2024, the South Dade Landfill had an available waste capacity of approximately 3,203,158 tons, which is a decrease of 8.89% from the July 1, 2023 available waste capacity. The decrease in capacity is attributable to additional waste placement. The SDLF accepted 748,313 tons of waste between July 1, 2023 and June 30, 2024, which is an increase of 15.43% from the previous reporting period. Based on the waste tonnage recorded from inception through June 30, 2024, there is approximately 21,683,964 tons of waste in the SDLF.

Resources Recovery Facility Ashfill

As of July 1, 2024, the Resources Recovery Facility Ashfill had an available waste capacity of approximately 1,121,485 tons, which is an increase of 0.15% from the July 1, 2023 available waste capacity. The increase in capacity is attributable to no additional waste placement and settlement of existing waste. The RRFAF accepted 0 tons of waste between July 1, 2023 and June 30, 2024, which is a decrease of 100% from the previous reporting period. The large decrease in placed tonnage is a result of the catastrophic fire at the RRF that occurred on February 12, 2023, rendering the facility inoperable. Based on the waste tonnage recorded from inception through June 30, 2024, there is approximately 6,662,704 tons of waste in the RRFAF.

1 INTRODUCTION

1.1 Background

The Miami-Dade County Department of Solid Waste Management (DSWM) currently maintains and operates three active solid waste landfills, which are:

- North Dade Landfill (NDLF),
- South Dade Landfill (SDLF), and
- Resources Recovery Facility Ashfill (RRFAF).

DSWM is required to estimate the remaining volume/capacity of the referenced facilities and land permitted for future landfills annually and submit the results to Florida Department of Environmental Protection (FDEP) in accordance with the Florida Administrative Code (F.A.C.) Chapter 62-701.500(13)(c) which states:

(c) Maintain an annual estimate of the remaining life and capacity in cubic yards of the existing constructed landfill and remaining capacity and site life of other permitted areas not yet constructed. The annual estimate shall be based on a summary of the heights, length, and widths of the solid waste disposal units. The estimate shall be made and reported annually to the Department.

1.2 Purpose

The purpose of this report is to document the results of the Landfill Capacity Analysis in order to provide data to satisfy the F.A.C. Chapter 62-701.500(13)(c) requirements for the North Dade Landfill, South Dade Landfill, and Resources Recovery Facility Ashfill. The remaining landfill waste capacity calculated for the annual analysis is also used internally by DSWM for forecasting, scheduling, and cost estimating efforts. Revenue projections are based on the capacity analysis looking at not only the remaining life of the active landfill but also the life of future landfill cells.

The methodology used to complete the analysis is described in Section 2 of this report. The results of the capacity analysis for DSWM's three active landfills, including NDLF, SDLF, and RRFAF, are presented respectively in Sections 3, 4, and 5. The Appendices at the end of this report contain data, tabulations, and comparison tables that support the 2024 Landfill Capacity Analysis.

2 PROJECT APPROACH

2.1 Methodology

The methodology used for the 2024 Landfill Capacity Analysis was divided into several key steps, which are described in detail below.

2.1.1 Gross Volume Remaining

Aerial surveys of each facility were conducted on July 22 at NDLF, August 13 at SDLF, and June 24 at RRFAF, 2024, by Stoner Surveyors and were provided electronically to Arcadis. The Gross Volume Remaining was calculated for NDLF, SDLF, and RRFAF based on the 2024 surveys and final closure grades. The 2024 Landfill Capacity Analysis was completed with AutoCAD Civil 3D software, by determining the volume, or the Gross Volume Remaining in the landfill, between the latest topographic aerial survey and the final permitted closure grades. Final closure grades for the three landfills were calculated previously by Arcadis based on assumed side slope and top grades provided by DSWM staff.

2.1.2 Cover Volumes

Volumes for the final cover, intermediate cover, and initial cover were calculated to approximate the Net Waste Capacity Remaining. The thickness of the final cover (24 inches) and intermediate cover (12 inches) were determined based upon current FDEP regulations. Volumes for these covers were calculated by multiplying the cover depth by the calculated area. The volume of initial cover was calculated using an assumed percentage of the Gross Volume Remaining. The assumed percentages were estimated to be 5%, 8% and 0% for NDLF, SDLF, and RRFAF, respectively. A weighted factor was used to determine the volume for the initial cover since multiple materials were used with different densities.

2.1.3 Net Waste Volume Remaining

The Net Waste Volume Remaining was calculated as follows:

$$N = G - F - M - I$$

Where:

N = Net Waste Volume Remaining (as of date of survey)
G = Gross Volume Remaining (as of date of survey)
F = Final Cover Volume
M = Intermediate Cover Volume
I = Initial Cover Volume

2.1.4 Settlement

A weighted volume was used to determine the volume gained by settlement after placement and compaction. High rates of settlement are common in landfills but can vary greatly depending upon

numerous factors such as waste type, thickness, age, regional factors, etc. The settlement percentages varied for the three active landfills with assumed values of 10% for NDLF, 15% for SDLF, and 2% for RRFAF.

2.1.5 Net Waste Volume Remaining After Settlement

The resulting corrected Net Waste Volume Remaining value, $\mathbf{N_S}$, represents the anticipated volume which will become available for waste disposal over the life of the landfill. This volume is calculated as shown below.

$$N_S = G - F - M - I + S$$

Where:

N_S = Net Waste Volume Remaining after Settlement (as of date of survey)
G = Gross Volume Remaining (as of date of survey)
F = Final Cover Volume
M = Intermediate Cover Volume
I = Initial Cover Volume
S = Settlement Volume Gained during Cell Life

2.1.6 Conversion to Tonnage

The Net Waste Volume Remaining and the Net Waste Volume Remaining after Settlement are calculated in terms of volume (cubic yards). These volumetric values are used to meet the FDEP regulatory requirements described in Section 1 of this report. However, the DSWM Waste In-Place Records are in terms of weight (tons). Therefore, the Net Waste Volume Remaining values as of the dates of the surveys were converted to tonnage by multiplying the calculated volumes by in-place waste densities. The following waste density values were used for the conversion:

NDLF = 0.50 tons/cubic yard
SDLF = 0.55 tons/cubic yard
RRFAF = 1.35 tons/cubic yard

2.1.7 Waste Capacity Analysis

To determine the Waste Capacity Available as of July 1, 2024 for the DSWM audit requirements, the Waste Disposal Tonnage between June 30, 2024 and the survey dates shown in Table 2 of Appendix A was subtracted from the Waste Capacity Remaining value as of the survey dates. Table 2 included in Appendix A provides a summary of the capacity analysis calculations.

2.1.8 Built-Out Capacity

The built-out capacity was calculated for each of the three landfills as shown in Table 3 of Appendix A. This table sums the data from Tables 1 and 2 to determine the total waste life capacity of the landfills. These values provide DSWM with an outlook of past, current, and future status and capacities in terms of total tons of waste placed from inception to closure. The table identifies the landfill cells that are closed,

full, active, or planned for future use; allowing for planning and budgetary projections to be made for potential revenues, closure costs, long-term maintenance needs, and future capacity availability.

2.1.9 Permitted Available Capacity as of October 1, 2024

Table 4 of Appendix A shows the additional tonnages disposed at the landfills from July 1, 2024 through September 30, 2024 and as a result shows the permitted capacity available as of October 1, 2024.

2.2 Terminology Used

Terminology and definitions are provided below:

Final Cover	Final cover, per Chapter 62-701.200 (39), F.A.C., means "the material used to cover the top and sides of the landfill when fill operations cease."
Gross Volume Remaining	The Gross Volume Remaining is the volumetric capacity calculated based on the survey dates by Longitude Surveyors, LLC and the theoretical profile of the landfill at closure based on the final grades established in the operating permit.
Initial Cover	Initial cover, per Chapter 62-701.200 (59), F.A.C., means "a minimum 6-inch layer of compacted earth used to cover an area of Solid Waste before placement of additional waste, intermediate cover, or final cover. The term also includes other material or thickness approved by the DSWM that minimizes disease vector breeding, animal attraction, and moisture infiltration; minimized fire potential; prevents blowing litter; controls odors; and improves landfill appearance."
In-place Waste Density	The original in-place compacted densities of different categories of waste (e.g., Trash, Garbage, and Ash) were taken from established densities used during previous years' capacity calculations.
Intermediate Cover	Intermediate cover, per Chapter 62-701.200 (61), F.A.C., means "a layer of compacted earth at least one foot in depth applied to a Solid Waste disposal unit. The term also includes other material or thickness approved by the DSWM that minimized disease vectors, odors, and fire, and is consistent with the leachate control design of the landfill."
Net Waste Volume Remaining	The Net Waste Volume Remaining is defined as the volumetric capacity available for waste disposal after accounting for the volume taken up by initial, intermediate, and final cover material.

Settlement	Settlement is the result of consolidation of in-place waste. Consolidation occurs when initial void spaces in the refuse are replaced with surrounding waste and can be the result of additional waste placement and/or the decomposition of the existing waste. This process occurs over time but must be accounted for in the capacity analysis calculations.
Tonnage of In-place Waste	DSWM provided the tonnages of in-place waste in the landfills. These tonnages are the actual quantities that were physically deposited in the landfills and were prepared by using actual scale house data.

3 NORTH DADE LANDFILL

3.1 Landfill Description

The North Dade Landfill is one the three landfills operated by Miami-Dade County Department of Solid Waste Management (DSWM). The North Dade Landfill's mailing address and entrance to the landfill is located at 21500 NW 47th Avenue. The site is bounded by the Florida Turnpike Homestead Extension to the north, NW 47th Avenue to the east, and NW 57th Avenue to the west. The south side of the landfill is bounded by the Snake Creek Canal.

The facility encompasses a total area of 218 acres, of which about 180 acres are designated for waste disposal. The waste disposal area is composed of two cells, the West Cell and the East Cell. The West Cell has a waste disposal limit of approximately 96 acres and is not active. The East Cell has a waste disposal limit of approximately 84 acres and currently accepts waste. The existing topography, proposed final grades, and cross section of the NDLF are provided in Figures 1A through 1C in Appendix B.

The landfill is permitted to accept only Class III waste. By FDEP definition, Class III waste means "yard trash, construction and demolition debris, processed tires, asbestos, carpet, cardboard, paper, glass, plastic, furniture other than appliances, or other materials approved by the Department that are not expected to produce leachate which poses a threat to public health or the environment."

Aerial surveys of the North Dade Landfill were conducted on July 22, 2024 by Stoner Surveyors and reflect the existing grades at the time of the survey. This topography was used to calculate the Gross Volume Remaining as of July 22, 2024.

3.2 Assumptions

Arcadis made a number of assumptions to complete the capacity analysis for the DSWM Landfill Analysis. The assumptions used for NDLF are:

1. The East Cell final grades will be constructed in accordance with the original Brown and Caldwell 1988 Operation Plans and the FDEP existing operating permit, as shown in Figures 1B and 1C.
2. The intermediate cover will have a thickness of 12 inches over the entire waste disposal area. This material will not be reused as a final cover.
3. The final cover will have a thickness of 24 inches placed over top the intermediate cover. The top 6 inches will consist of topsoil and the bottom 18 inches will consist of general soil.
4. The initial cover consumes 5% of the Gross Volume Remaining.
5. Additional volume gained in the East Cell to the Net Waste Volume Remaining due to consolidation, settlement, and degradation is 10%.
6. The calculated in-place waste density is 0.50 tons per cubic yard.

3.3 Results

The results of the analysis are summarized in Table 3-1 with the details provided in Tables 1 through 4 of Appendix A.

Table 3--1.
Summary of Landfill Capacity Analysis for NDLF

Total Tonnage of In-place Waste as of 6/30/23 (tons)	Total Tonnage Placed Between 7/1/22 - 6/30/23 (tons)	Total Tonnage Placed Between 7/1/23 - 6/30/24 (tons)	Net Waste Volume Remaining as of 7/22/2024 (cy)	Additional Volume Gained from Settlement During Life of Cell (cy)	Total Tonnage of In-place Waste as of 6/30/24 (tons)	Waste Capacity Available as of 7/1/24 (tons)	Total Tonnage of In-place Waste from 7/1/24 to 9/30/24 (tons)	Waste Capacity Available as of 10/1/24 (tons)
13,523,080	152,051	104,498	1,612,719	161,272	13,627,578	880,554	30,913	849,641

As shown in Table 3-1, the Waste Capacity Available as of July 1, 2024 was calculated to be 880,554 tons, which is 4.44% less than the waste capacity of 921,501 tons that was available as of July 1, 2023 for the East Cell. NDLF received 104,498 tons of waste from July 1, 2023 through June 30, 2024, which is a decrease of 31.27% from the previous reporting period. Assuming no additional disposal capacity is constructed and future waste placement rates and in-place densities are as expected, the NDLF is estimated to reach capacity in approximately 5 years (2029).

4 SOUTH DADE LANDFILL

4.1 Landfill Description

The South Dade Landfill (SDLF) mailing address and entrance to the landfill is located at 23707 SW 97th Avenue in the southeast region of Miami-Dade County. The site is bordered by a county park and Black Point Marina on the east, the Black Creek Canal to the north, SW 97th Avenue to the west and the Goulds Canal and SW 248th Street to the south. Some additional landmarks to the site include the South District Wastewater Treatment Plant to the north of the Black Creek Canal, the Homestead Air Reserve base two miles to the south, the Biscayne Bay one mile to the east, and the Florida Turnpike one mile to the west of the SDLF.

SDLF consists of 200 acres of disposal area located on 300 acres of land. The 200 acres are divided into five cells. The status and capacity (tonnage) of the cells is presented in Table 3 of Appendix A along with a summary of the landfill cells below:

- Cells 1, 2 and 3 (~100 acres together) are closed,
- Cell 4 (~54 acres) is active and currently receiving waste,
- Cell 5 (~46 acres) is active and currently receiving waste.

The landfill is permitted to accept Class I waste, which by FDEP definition 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.” Since Class I waste contains more odor producing material, the landfill applies initial cover more frequently than the NDLF and as a result the assumption for initial cover (8%) is higher.

The existing topography proposed final grades, and cross section of the SDLF are provided in Figures 2A through 2D in Appendix B. Aerial surveys of the South Dade Landfill were conducted on August 13, 2024 by Stoner Surveyors and reflect the existing grades at the time of the survey. This topography was used to calculate the Gross Volume Remaining as of August 13, 2024.

4.2 Assumptions

Arcadis made a number of assumptions to complete the capacity analysis for the DSWM Landfill Capacity Analysis. The assumptions used for SDLF are:

1. The final grades for Cell 4 will be constructed in accordance with the closure grades provided by Brown and Caldwell, as shown in Figures 2B and 2D.
2. This analysis assumes that the final grades for Cell 5 will be constructed in accordance with the closure grades developed by Arcadis, as shown in Figures 2B and 2D.
3. The intermediate cover will have a thickness of 12 inches over the entire waste disposal area. This material will not be reused as a final cover.
4. The final cover will have a thickness of 24 inches placed over top the intermediate cover. The top 6 inches will consist of topsoil and the bottom 18 inches will consist of general soil.
5. The initial cover consumes 8% of the Gross Volume Remaining.

6. Additional volume gained to the Net Waste Volume Remaining due to consolidation, settlement, and degradation is 15%.
7. The calculated in-place waste density is 0.55 tons per cubic yard.

4.3 Results

The results of the analysis are summarized in Table 4-1 with the details provided in Tables 1 through 4 of Appendix A.

Table 4--1.
Summary of Landfill Capacity Analysis for SDLF

Total Tonnage of In-place Waste as of 6/30/23 (tons)	Total Tonnage Placed Between 7/1/22 - 6/30/23 (tons)	Total Tonnage Placed Between 7/1/23 - 6/30/24 (tons)	Net Waste Volume Remaining as of 8/13/2024 (cy)	Additional Volume Gained from Settlement During Life of Cell (cy)	Total Tonnage of In-place Waste as of 6/30/24 (tons)	Waste Capacity Available as of 7/1/24 (tons)	Total Tonnage of In-place Waste from 7/1/24 to 9/30/24 (tons)	Waste Capacity Available as of 10/1/24 (tons)
20,935,652	648,270	748,313	5,199,203	779,880	21,683,965	3,203,158	151,067	3,052,091

As shown in Table 4-1, the Waste Capacity Available as of July 1, 2024 was calculated to be 3,203,158 tons, which is 8.89% less than the waste capacity of 3,515,713 tons that was available as of July 1, 2023 for SDLF. In addition, SDLF received 748,313 tons of waste from July 1, 2023 through June 30, 2024, which is an increase of 15.43% from the previous reporting period. Assuming no additional disposal capacity is constructed and future waste placement rates and in-place densities are as expected, the SDLF is estimated to reach capacity in approximately 4 years (2028).

5 RESOURCES RECOVERY FACILITY ASHFILL

5.1 Landfill Description

The Resources Recovery Facility Ashfill (RRFAF) is located adjacent to the Miami-Dade County Resources Recovery Facility at 6990 NW 97th Ave. Miami, FL 33178. The facility is bounded by NW 97th Avenue to the east, NW 66th Street to the south, NW 107th Avenue to the west, and NW 74th Street to the north. Other notable landmarks near the facility are the Miami International Airport, the Florida Turnpike, and the Palmetto Expressway.

This landfill is permitted under the Power Plant Siting Act to receive ash from the Miami-Dade County Resources Recovery Facility. The Miami-Dade County Resources Recovery Facility site consists of 160 acres, of which the western 80 acres is used for the RRFAF. The 80-acres are divided into 20 cells as follows:

- Cells 1-19: 61.5 acres, Status = Closed,
- Cell 20: 16 acres, Status = Active – Opened July 11, 2013.

Table 3 of Appendix A shows the current and future capacities for each of the landfill cells, along with the status of the cells. The capacity of Cell 20 was calculated previously by Arcadis based on assumed side slope and top grades provided by DSWM staff. The existing topography, proposed final grades, and cross section of the RRFAF are provided in Figures 3A through 3C in Appendix B.

Aerial surveys of the Resources Recovery Facility Ashfill were conducted on June 24, 2024 by Stoner Surveyors and reflect the existing grades at the time of the survey. This topography was used to calculate the Gross Volume Remaining as of June 24, 2024.

5.2 Assumptions

Arcadis made a number of assumptions to complete the capacity analysis for the DSWM Landfill Capacity Analysis. The assumptions used for RRFAF are:

2. The final grades for Cell 20 will be constructed in accordance with the closure grades developed previously by Arcadis, as shown in Figures 3B and 3C in Appendix B.

3 The intermediate cover will have a thickness of 12 inches over the entire waste disposal area, but this material will be reused as a final cover. Therefore, it is not included in the capacity analysis.

4 The final cover will have a thickness of 24 inches. The top 6 inches will consist of topsoil and the bottom 18 inches will consist of general soil.

5 There is no initial cover placement.

6 Additional volume gained to the Net Waste Volume Remaining due to consolidation, settlement, and degradation is 2%.

7 The calculated in-place waste density is 1.35 tons per cubic yard.

5.3 Results

The results of the analysis are summarized in Table 5-1 with the details provided in Tables 1 through 4 of Appendix A.

Table 5--1.
Summary of Landfill Capacity Analysis for RRFAF

Total Tonnage of In-place Waste as of 6/30/23 (tons)	Total Tonnage Placed Between 7/1/22 - 6/30/23 (tons)	Total Tonnage Placed Between 7/1/23 - 6/30/24 (tons)	Net Waste Volume Remaining as of 8/13/2024 (cy)	Additional Volume Gained from Settlement During Life of Cell (cy)	Total Tonnage of In-place Waste as of 6/30/24 (tons)	Waste Capacity Available as of 7/1/24 (tons)	Total Tonnage of In-place Waste from 7/1/24 to 9/30/24 (tons)	Waste Capacity Available as of 10/1/24 (tons)
6,662,704	72,114	0	814,440	16,289	6,662,704	1,121,485	0	1,121,485

As shown in Table 5-1, the Waste Capacity Available as of July 1, 2024 was calculated to be 1,121,485 tons, which is 0.15% more than the waste capacity of 1,119,847 tons that was available as of July 1, 2023, the small increase is due to settlement within the landfill. RRFAF received 0 tons of waste from July 1, 2023 through June 30, 2024, which is a decrease of 100% from the previous reporting period. The large decrease in placed tonnage is a result of the catastrophic fire at the RRF that occurred on February 12, 2023, rendering the facility inoperable.

APPENDIX A

Landfill Capacity Analysis Data and Calculations Tables

ARCADIS

MDC054

Table 1 – Actual Waste Tonnage Disposed at DSWM Landfills as of July 1, 2024[b]

Facility	Total Tonnage of In-place Waste as of 6/30/23 (tons)[a]	7/1/23 - 7/31/23 (tons)	8/1/23 - 8/31/23 (tons)	9/1/23 - 9/30/23 (tons)	10/1/23 - 10/31/23 (tons)	11/1/23 - 11/30/23 (tons)	12/1/23 - 12/31/23 (tons)	1/1/24 - 1/31/24 (tons)	2/1/24 - 2/28/24 (tons)	3/1/24 - 3/31/24 (tons)	4/1/24 - 4/30/24 (tons)	5/1/24 - 5/31/24 (tons)	6/1/24 - 6/30/24 (tons)	Total Tonnage Placed Between 7/1/23 - 6/30/24	Total Tonnage of In-place Waste as of 6/30/24 (tons)[c]
North Dade Landfill (East Cell)	13,523,080	9,858	6,947	8,077	9,834	11,067	7,407	12,354	7,635	8,855	7,890	5,893	8,681	104,498	13,627,578
South Dade Landfill (Cell 4 and 5)	20,935,652	66,954	68,957	65,902	64,881	66,691	60,588	64,231	57,320	57,271	58,618	59,590	57,310	748,313	21,683,965
Resources Recovery Facility Ashfill (Cell 20)	6,662,704	0	0	0	0	0	0	0	0	0	0	0	0	0	6,662,704

Notes:

(a) Source: Landfill Capacity Analysis for DSWM Active Landfills as of July 1, 2023 – prepared by ARCADIS-U.S., Inc., October 30, 2024.

(b) All tonnage data provided by DSWM on July 22, 2024.

(c) Total tonnage in place as of June 30, 2024 = (Total tonnage in-place as of June 30, 2023) + (Total tonnage placed between July 1, 2023 and June 30, 2024).

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MDC055

Table 2 – Capacity Analysis Calculations as of July 1, 2024

Facility	Gross Volume Remaining as of Survey Date (cy)[a]	Estimated Volume of 24" Final Cover (cy)[b]	Assumed Volume of Intermediate Cover (cy)[c]	Assumed Volume of Initial Cover (cy)[d]	Net Waste Volume Remaining as of Survey Date (cy)[a]	Additional Volume Gained from Settlement During Life of Cell (cy)[e]	Calculated In-place Waste Density (ton/cy)[f]	Waste Capacity Remaining as of Survey Date (tons)[a]	Waste Disposal from 6/30/24 to Survey date (tons)[a]	Waste Capacity Available as of 7/1/24 (tons)	Waste Capacity Available as of 7/1/23 (tons)[h]	Difference (+/-)
North Dade Landfill (East Cell)	2,137,784	278,784	139,392	106,889	1,612,719	161,272	0.50	886,995	6,441	880,554	921,501	-4.44%
South Dade Landfill (Cell 4 and 5)	6,237,895	359,773	179,887	499,032	5,199,203	779,880	0.55	3,288,496	85,338	3,203,158	3,515,713	-8.89%
Resources Recovery Facility Ashfill (Cell 20)	914,467	100,027	0	0	814,440	16,289	1.35	1,121,485	0	1,121,485	1,119,847	0.15%

Notes:

(a) Gross Volume Remaining for the NDLF, SDLF and RRFAF based on the existing grades as of July 22 at NDLF, August 13 at SDLF, and June 24 at RRFAF, 2024, by Stoner Surveyors. Final design grades for NDLF and SDLF (Cell 4) provided by Brown & Caldwell. Final design grades for SDLF (Cell 5) and RRFAF conceptualized by Arcadis.

(b) Assumes 24 inches of final cover over calculated area as: NDLF 86.4 ac, SDLF (Cell 4) 65.5 ac, SDLF (Cell 5) 46 ac, RRF 31.0 ac.

(c) Assumes 12 inches of intermediate cover over calculated area as: NDLF 86.4 ac, SDLF (Cell 4) 65.5 ac., SDLF (Cell 5) 46 ac

(d) Initial cover assumed as: NDLF -5%, SDLF -8%, RRFAF -0%.

(e) Settlement assumed as: NDLF +10%, SDLF +15%, RRFAF +2%.

(f) In-place Waste Density based on Arcadis' experience.

(h) Source: Landfill Capacity Analysis for DSWM Active Landfills as of July 1, 2024 – prepared by Arcadis-US, Inc., October 30, 2024.

Table 3. Summary of Current and Future Capacities as of July 1, 2024					
Landfill Cells	**Status**	**Permitted Capacity Available on 7/1/24 (tons)(a)**	**Permitted Design Capacity of Future Cell (tons)**	**In-Place Waste Tonnage as of 6/30/24 (tons)(b)**	**Built-out Capacity (tons)[c]**
North Dade (West Cell)	Closed	0	- - - - - -	- - - - - -	- - - - - -
North Dade (East Cell)	Active	880,554	- - - - - -	- - - - - -	- - - - - -
Total North Dade Landfill	**Class III**	**880,554**	**0**	**13,627,578**	**14,508,132**
South Dade Landfill (Cells 1, 2 & 3)	Closed	0	- - - - - -	- - - - - -	- - - - - -
South Dade Landfill (Cell 4)	Active	90,482	- - - - - -	- - - - - -	- - - - - -
South Dade Landfill (Cell 5)	Open	3,112,676	- - - - - -	- - - - - -	- - - - - -
Total South Dade Landfill	**Class I**	**3,203,158**	**0**	**21,683,965**	**24,887,123**
Resources Recovery Facility Ashfill (Cells 1 - 18)	Closed	0	- - - - - -	- - - - - -	- - - - - -
Resources Recovery Facility Ashfill (Cell 19)[d]	Full	0	- - - - - -	- - - - - -	- - - - - -
Resources Recovery Facility Ashfill (Cell 20)[e]	Active	1,121,485	- - - - - -	- - - - - -	- - - - - -
Total Resources Recovery Facility Ashfill	**Ash**	**1,121,485**	**0**	**6,662,704**	**7,784,189**

Notes:

(a) Reference Table 2 - Volume Calculations as of July 1, 2024.

(b) Reference Table 1 – Summary of Actual Waste Tonnage Disposed at DSWM Landfills as of July 1, 2024.

(c) Total capacity of the existing and future cells.

(d) Cell 19 closed on July 10, 2013.

(e) Cell 20 opened on July 11, 2013.

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Table 4. Permitted Landfill Capacity Available for DSWM as of October 1, 2024						
Facility	**Tonnage of In-Place Waste**			**Total In-Place Waste from 7/1/24 to 9/30/24 (tons)**	**Permitted Capacity Available on 7/1/24 (tons)**	**Permitted Capacity Available on 10/1/24 (tons)[b]**
	July [a] 2024	**August[a] 2024**	**September[a] 2024**			
North Dade Landfill (East Cell)	9,076	9,777	12,060	30,913	880,554	849,641
South Dade Landfill (Cell 4 and 5)	60,609	58,968	31,490	151,067	3,203,158	3,052,091
Resources Recovery Facility Ashfill (Cell 20)	0	0	0	0	1,121,485	1,121,485

Notes:

(a) Data provided by DSWM on October 8, 2024.

(b) Capacity as of October 1, 2024 is reported for DSWM auditing purposes. Report is dated July 1, 2024 to fulfill FDEP requirements.

APPENDIX B

Landfill Capacity Analysis Figures

North Dade Landfill

Figure 1A. North Dade Landfill Site Plan

Figure 1B. North Dade Landfill Grading Plan

Figure 1C. North Dade Landfill Cross Sections

South Dade Landfill

Figure 2A. South Dade Landfill Site Plan

Figure 2B. South Dade Landfill Grading Plan

Figure 2C. South Dade Landfill Cross Sections

Resources Recovery Facility Ashfill

Figure 3A. Resources Recovery Facility Ashfill Site Plan

Figure 3B. Resources Recovery Facility Ashfill Grading Plan

Figure 3C. Resources Recovery Facility Ashfill Cross Sections

LEGEND

100 —— EXISTING CONTOUR

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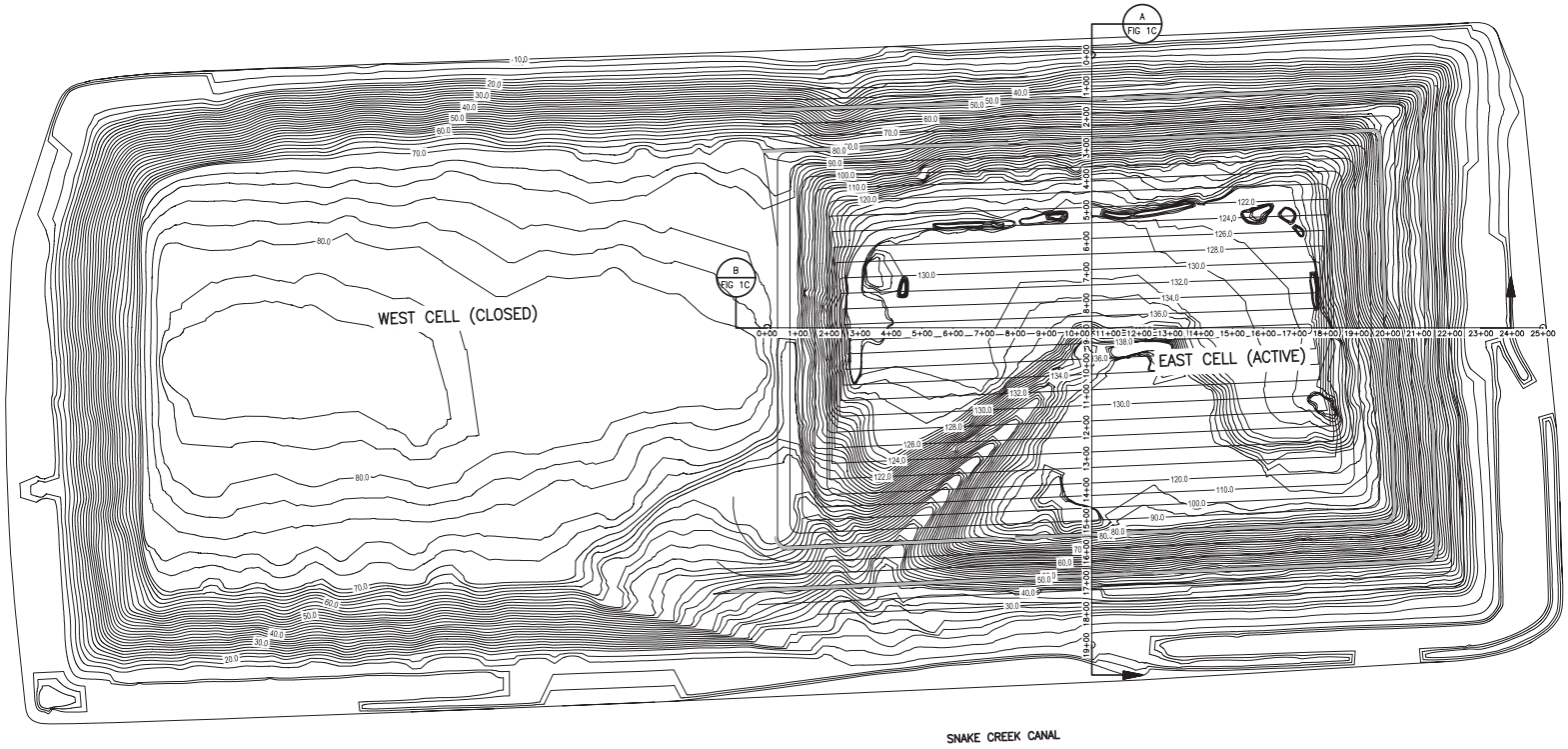
DSWM ANNUAL CAPACITY REPORT
30229246

NORTH DADE LANDFILL SITE PLAN
FIGURE 1A

MDC059



MDC060

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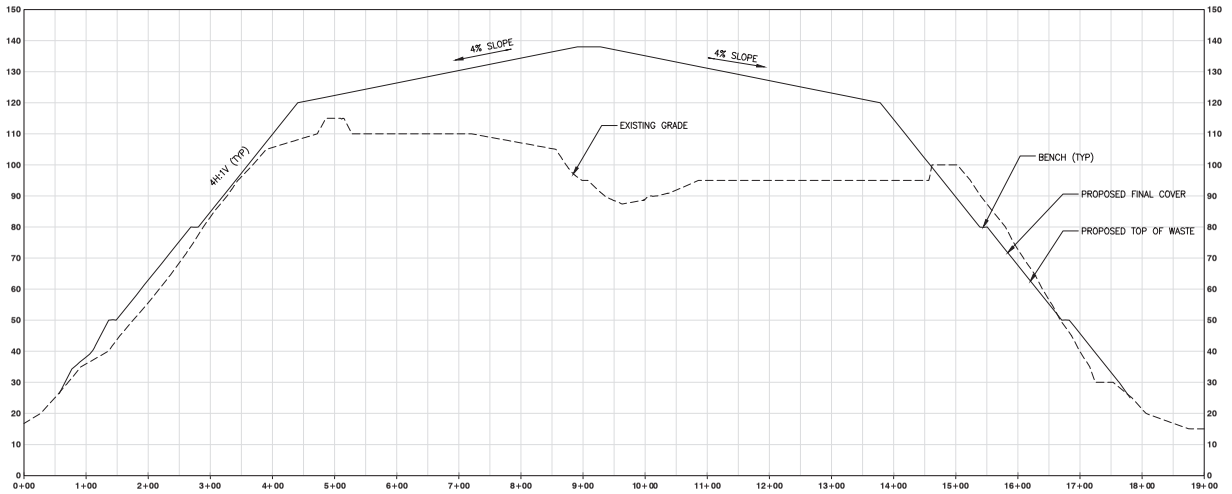
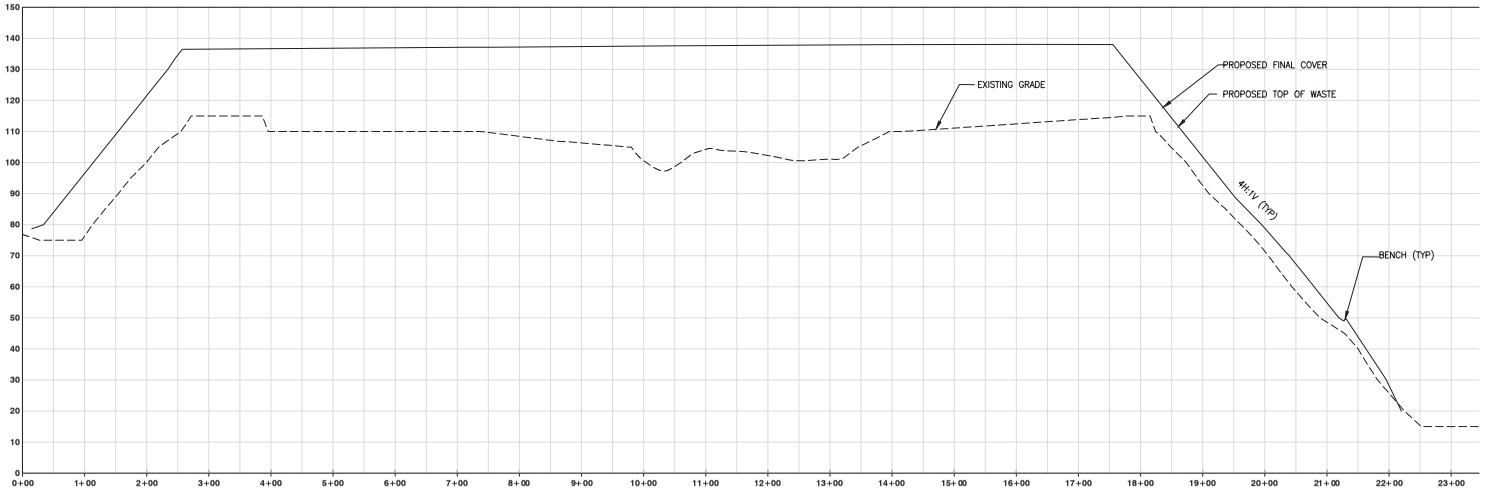
DSWM ANNUAL CAPACITY REPORT
30229246

NORTH DADE LANDFILL SITE PLAN
FIGURE 1B



SECTION A / FIG 1B



SECTION B / FIG 1B

LEGEND

PROPOSED FINAL COVER

EXISTING GRADE

GRAPHIC HORIZONTAL SCALE 50' 0 100'

GRAPHIC VERTICAL SCALE (4x EXAGGERATED) 12.5' 0 25'

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30229246

NORTH DADE LANDFILL SITE PLAN
FIGURE 1C

MDC061

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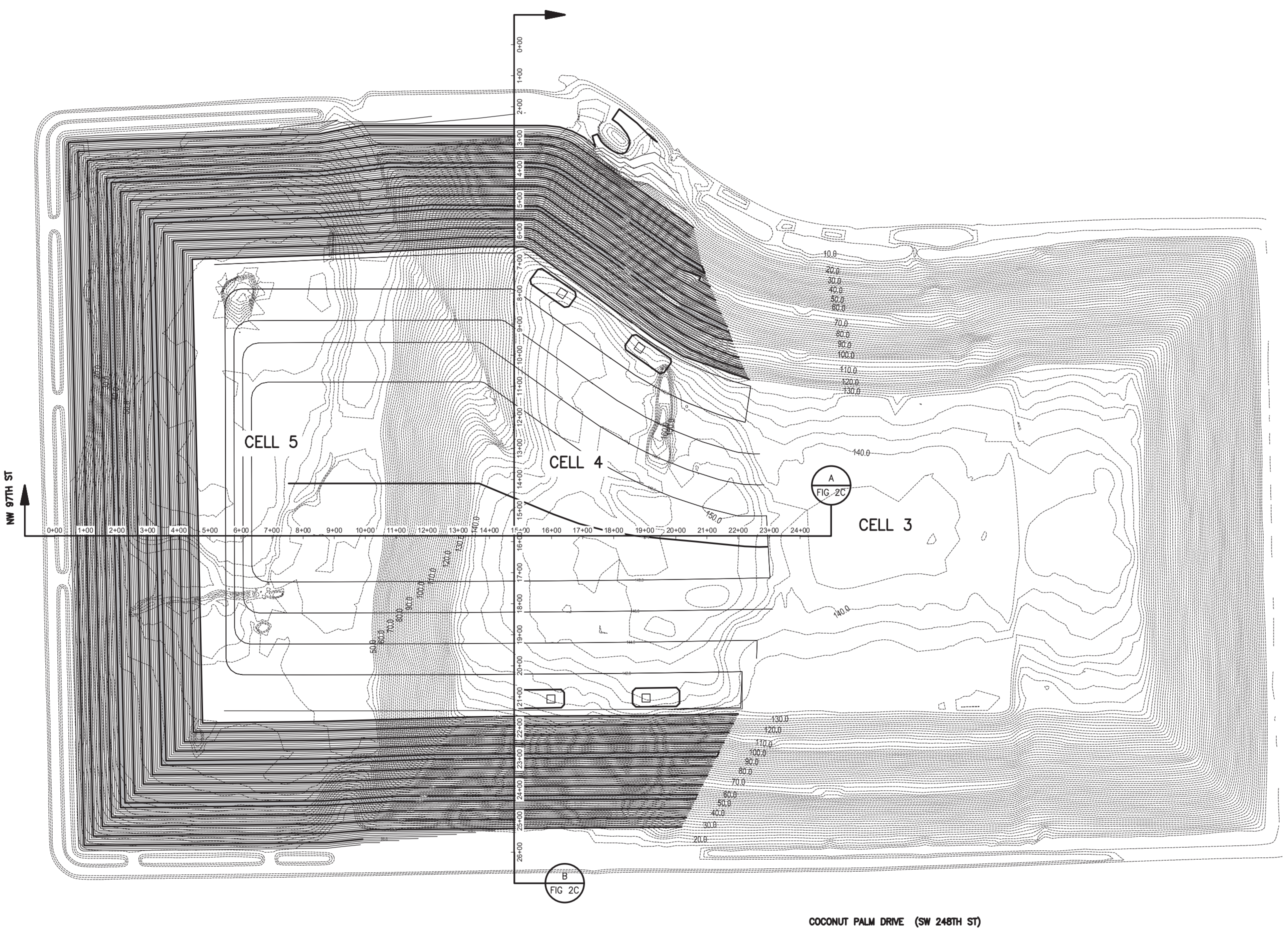
30229246

SOUTH DADE LANDFILL SITE PLAN
FIGURE 2A

ARCADIS Design & Consultancy for natural and built assets

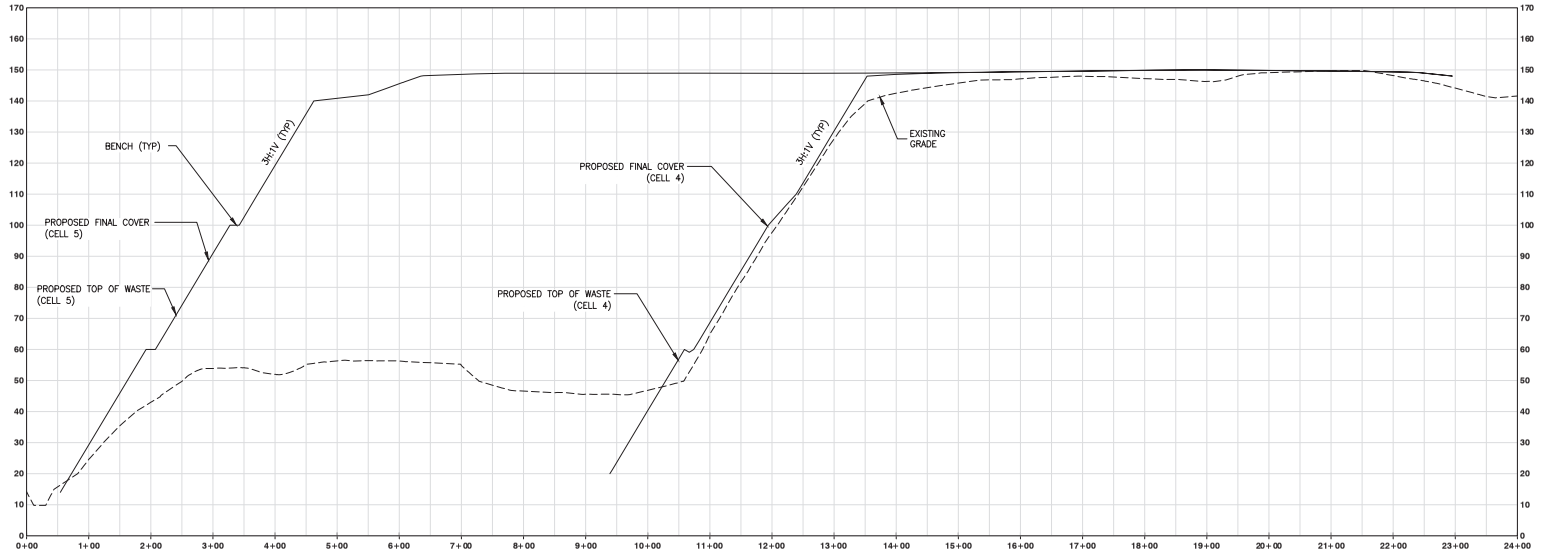
MDC062



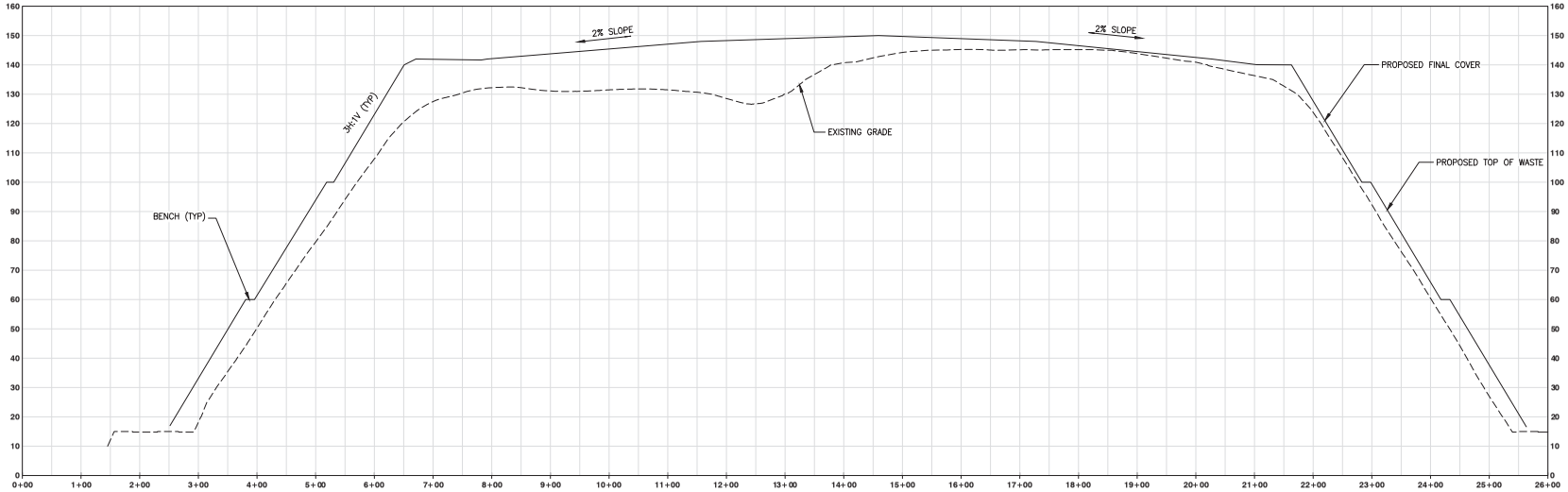
MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

DSWM ANNUAL CAPACITY REPORT
30229246

SOUTH DADE LANDFILL SITE PLAN
FIGURE 2B



SECTION A FIG 2B



SECTION B FIG 2B

LEGEND

PROPOSED FINAL COVER

EXISTING GRADE

0 100' 200'
GRAPHIC HORIZONTAL SCALE

0 20' 40'
GRAPHIC HORIZONTAL SCALE

MDC064

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30229246

SOUTH DADE LANDFILL SITE PLAN
FIGURE 2C

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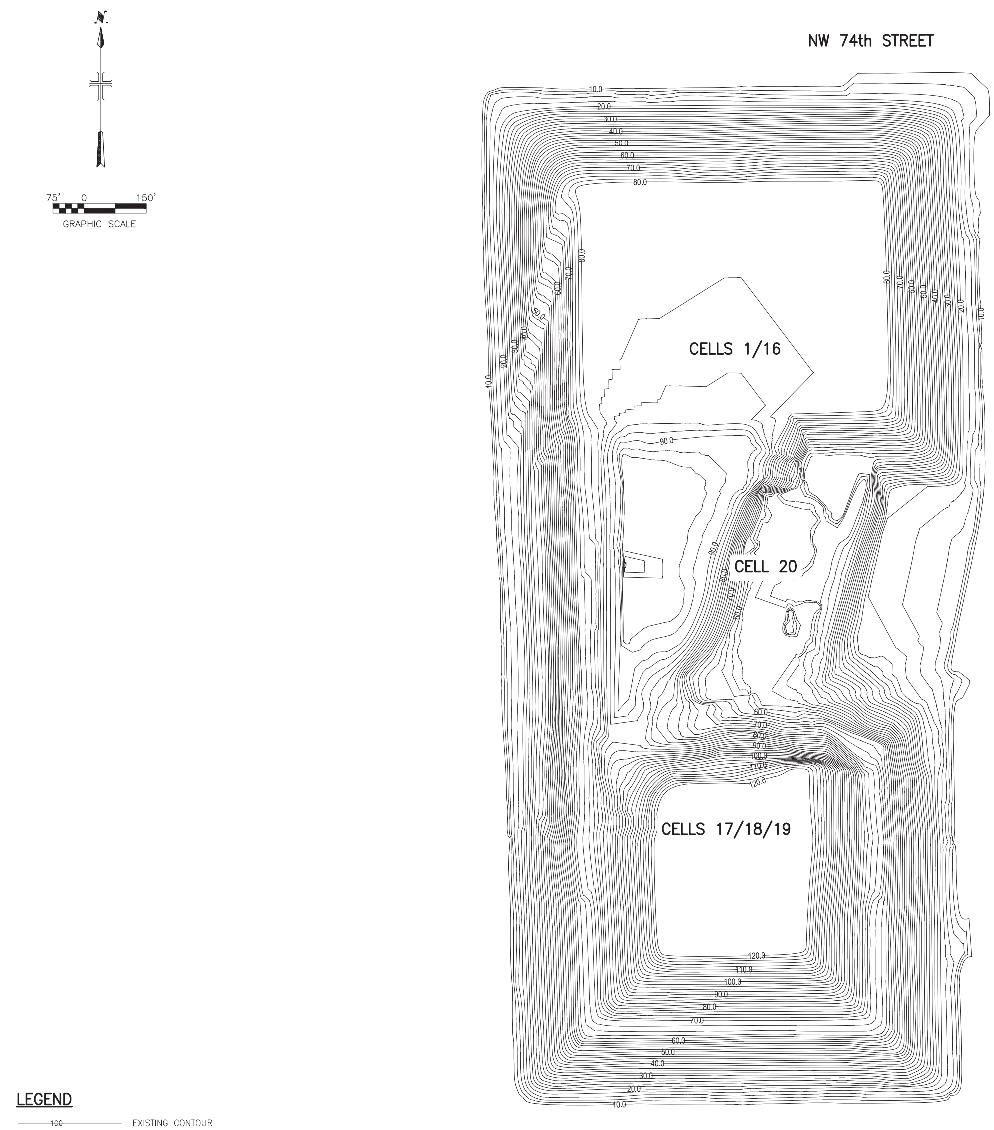
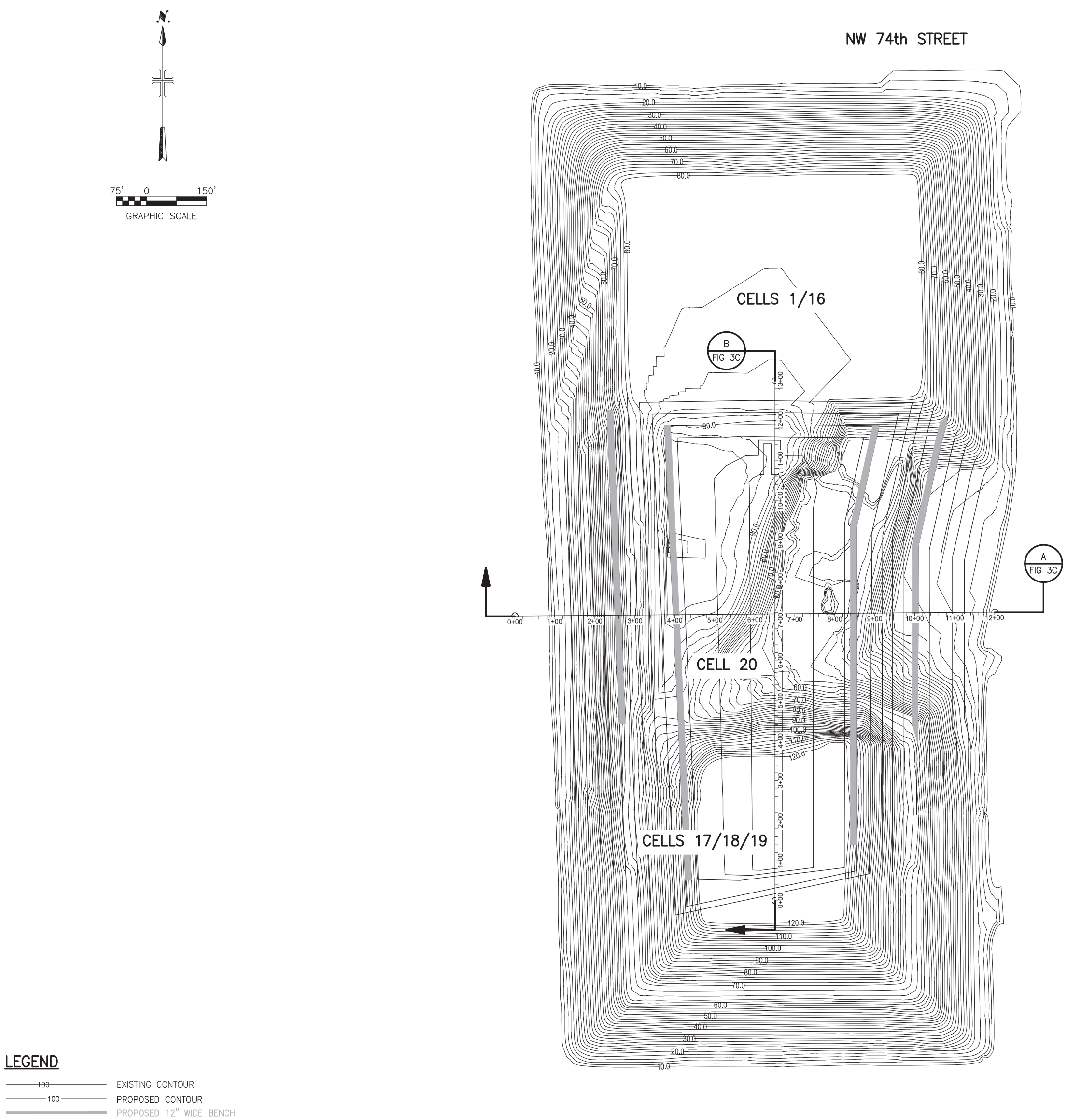


MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

DSWM ANNUAL CAPACITY REPORT
30229246

RESOURCES RECOVERY FACILITY ASHFILL SITE PLAN
FIGURE 3A

ARCADIS Design & Consultancy for natural and built assets

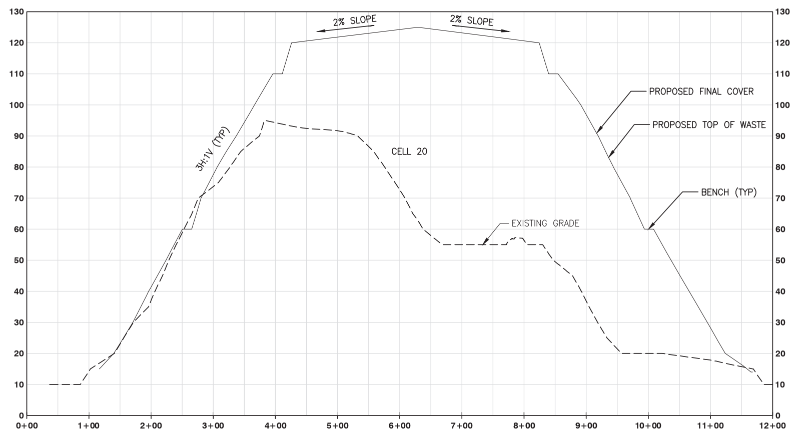


MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

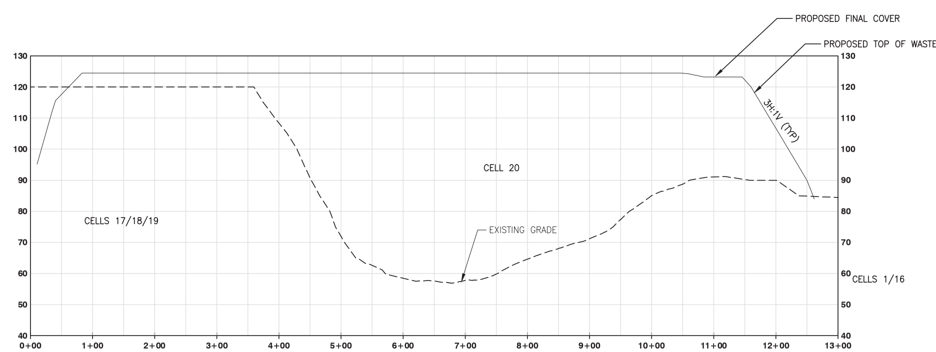
DSWM ANNUAL CAPACITY REPORT
30229246

RESOURCES RECOVERY FACILITY ASHFILL SITE PLAN
FIGURE 3B

ARCADIS Design & Consultancy for natural and built assets



SECTION A / FIG 3B



SECTION B / FIG 3B

LEGEND

- ——— PROPOSED FINAL COVER
- — — — EXISTING GRADE

50' 0 100'
GRAPHIC HORIZONTAL SCALE

12.5' 0 25'
GRAPHIC VERTICAL SCALE (4x EXAGGERATED)

ARCADIS Design & Consultancy for natural and built assets

MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

DSWM ANNUAL CAPACITY REPORT
30229246

RESOURCES RECOVERY FACILITY ASHFILL SITE PLAN
FIGURE 3C

MDC067

APPENDIX C

Correspondence

- E-mail dated July 22, 2024 from Ravi Kadambala of DSWM with the October 2023 through June 2024 tonnage data for the three DSWM active landfills.

From: Kadambala, Ravi (DSWM) <Ravi.Kadambala@miamidade.gov>
Sent: Monday, July 22, 2024 10:47 AM
To: Tilman, Christopher <Christopher.Tilman@arcadis.com>; Anaxe, Geraldine (DSWM) <Geraldine.Anaxe@miamidade.gov>; Porcelli, Mario (DSWM) <Mario.Porcelli@miamidade.gov>
Subject: FW: LF Capacity Report

Arcadis Warning: Exercise caution with email messages from external sources such as this message. Always verify the sender and avoid clicking on links or scanning QR codes unless certain of their authenticity.

Good morning,
Thanks Geraldine for the tonnage data. I agree that the tonnage data should exclude cover material.

Chris, attached is the tonnage data requested for the capacity report.

Mario, attached is the tonnage data for the compliance report.

Thanks,

Ravi Kadambala, Ph.D., P.E., BCEE
Miami-Dade County Department of Solid Waste Management

(QUANTITY IN TONS)	ACTUAL OCT	ACTUAL NOV	ACTUAL DEC	ACTUAL JAN	ACTUAL FEB	ACTUAL MAR	ACTUAL APR	ACTUAL MAY	ACTUAL JUN	ACTUAL JUL	ACTUAL AUG	ACTUAL SEP	TOTAL
NET TONNAGE LANDFILLED AND BURNED													
S. DADE	64,880.64	66,690.89	60,587.97	64,231.15	57,320.19	57,270.64	58,618.36	59,589.64	57,309.56				546,499.04
N. DADE	9,833.99	11,066.50	7,407.26	12,353.84	7,635.25	8,855.17	7,889.70	5,892.95	8,680.74				79,615.40
R. RECOVERY ASHFILL	-	-	-	-	-	-	-	-	-				-

- E-mail dated October 8, 2024 from Ravi Kadambala of DSWM with the July 2024 through September 2024 tonnage data for the three DSWM active landfills.

From: Kadambala, Ravi (DSWM) <Ravi.Kadambala@miamidade.gov>
Sent: Tuesday, October 8, 2024 1:31:44 PM
To: Long, Allen <Allen.Long@arcadis.com>
Cc: Wong, John (DSWM) <John.Wong@miamidade.gov>
Subject: FW: Sept Tonnage report

Arcadis Warning: Exercise caution with email messages from external sources such as this message. Always verify the sender and avoid clicking on links or scanning QR codes unless certain of their authenticity.

Hi Allen,
Tonnage data for NDLF and SDLF for September is attached.

Thanks,

Ravi Kadambala, Ph.D., P.E., BCEE
Miami-Dade County Department of Solid Waste Management

(QUANTITY IN TONS)	ACTUAL OCT	ACTUAL NOV	ACTUAL DEC	ACTUAL JAN	ACTUAL FEB	ACTUAL MAR	ACTUAL APR	ACTUAL MAY	ACTUAL JUN	ACTUAL JUL	ACTUAL AUG	ACTUAL SEP	TOTAL
NET TONNAGE LANDFILLED AND BURNED													
S. DADE	65,157.55	67,225.77	60,720.78	64,325.36	57,313.99	57,271.14	58,618.36	59,589.64	57,309.56	60,609.31	58,967.73	31,489.71	698,598.90
N. DADE	9,833.99	11,066.50	7,407.26	12,353.84	7,635.25	8,855.17	7,889.70	5,892.95	8,680.74	9,076.09	9,776.59	12,060.18	110,528.26
R. RECOVERY ASHFILL	-	-	-	-	-	-	-	-	-	-	-		-

APPENDIX D

References

1. “Landfill Capacity Analysis for DSWM Active Landfills as of July 1, 2007.” October 30, 2007 prepared by Brown and Caldwell, Inc.
2. “Landfill Capacity Analysis for DSWM Active Landfills as of July 1, 2023.” October 30, 2023 prepared by Arcadis U.S., Inc.

Arcadis U.S., Inc.

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Miami

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Tel 305.262.6250

www.arcadis.com

Exhibit 3.2

NDL Vertical Expansion Scenarios (Arcadis)

EXHIBIT 3.2

ARCADIS

Mr. John Wong
Assistant Director
Department of Solid Waste Management
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Miami, Florida 33147

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Coral Gables
Florida 33134

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FL Engineering License #7917
FL Geology License #GB564
FL Surveying License #LB7062

March 14, 2025
North Dade Landfill Vertical Expansion Scenarios

Dear Mr. Wong,

Arcadis U.S., Inc. (Arcadis) is pleased to provide this letter to the Miami-Dade County Department of Solid Waste Management (DSWM) that provides a summary of conceptual volume and cost estimates for the vertical expansion of the North Dade Landfill (NDL). Please note that all estimates included in this letter are conceptual and may vary significantly from final design level estimates.

BACKGROUND

Arcadis was requested by DSWM to provide conceptual volume, lifespan and closure cost estimates for the vertical expansion of NDL. DSWM requested the following scenarios be evaluated:

- Increase the maximum elevation of the East Cell to 170 feet above mean sea level (amsl).
- Increase the maximum elevation of the West and East Cell to 170 feet amsl.
- Increase the maximum elevation of the East Cell to 200 feet amsl.
- Increase the maximum elevation of the West and East Cell to 200 feet amsl.

In addition to the revised closure costs, DSWM requested conceptual cost estimates for the construction of a new Class III liner over the West Cell as well as costs for the expansion of the landfill gas and collection system within the West Cell. A summary of those efforts is described below.

VERTICAL EXPANSION SCENARIOS

Existing slopes at NDL are approximately 4 horizontal (H) to 1 vertical (V) and extend to a maximum elevation of 140 feet amsl. For the proposed expansion scenarios, the proposed slopes were extended from the base of the landfill at a 3H:1V slope with no benches to capture additional capacity on the side slopes. The maximum elevation was set at either 170 feet amsl or 200 feet amsl; the topdeck maintains a slope of 4%.

To calculate the additional volume of each scenario, AutoCAD Civil 3D software was used to compare the current proposed closure grades (4H:1V slopes to 140 feet amsl) to the proposed expansion scenario closure grades. The resulting volume was then converted to tons using a density of 0.50 tons per cubic yard. The resulting capacity for each scenario is presented in Table 1 below. Figures showing the conceptual grading plan, including cross sections, are provided in Figures 1 through 14.

John Wong
Department of Solid Waste Management
March 14, 2025

Table 1 – Summary of Landfill Expansion Volumes

Grading Scenario	Additional Capacity[(a)] (cubic yards)	Additional Capacity[(b)] (tons)
East Cell Only - 170'	3,080,372	1,540,186
West and East Cell - 170'	10,080,372	5,040,186
East Cell Only - 200'	4,580,372	2,290,186
West and East Cell - 200'	13,080,372	6,540,186

Notes:
(a) These grading scenarios are based on the topographical survey performed on July 22, 2024.
(b) Assumed density of 0.50 tons/cubic yard.

To account for the lost capacity since the last topographical survey, the amount of waste disposed at NDL for the months between July 2024 through January 2025 was provided by DSWM and provided in Table 2 below.

Table 2 – Actual Waste Tonnage Disposed at NDLF from July 1, 2024 to January 31, 2025

Facility	7/1/24 - 7/31/24 (tons)	8/1/24 - 8/31/24 (tons)	9/1/24 - 9/30/24 (tons)	10/1/24 - 10/31/24 (tons)	11/1/24 - 11/30/24 (tons)	12/1/24 - 12/31/24 (tons)	1/1/25 - 1/31/25 (tons)	Total Tonnage Placed Since Last Survey (tons)
North Dade Landfill (East Cell)	9,858	6,947	8,077	12,864	15,612	13,914	12,542	72,819[(a)]

Notes:
(a) Topographical survey was performed on July 22, 2024. The tonnage for July was prorated accordingly.

The additional capacity for each scenario on January 31, 2025 was calculated by subtracting the waste tonnage placed since the last topographic survey from the capacity calculated at the time of the last topographic survey. The results are provided in Table 3, along with the projected additional lifespan gained (years) for each scenario assuming a constant disposal rate of 180,000 tons per year.

Table 3 – Remaining Capacity and Build Out Years

Grading Scenario	Additional Capacity as of Last Survey (tons)	Total Tonnage Placed Since Last Survey (tons)	Additional Capacity as of 1/31/25 (tons)	Additional Years Gained
East Cell Only - 170'	1,540,186	72,819	1,467,367	8
West and East Cell - 170'	5,040,186	72,819	4,967,367	28
East Cell Only - 200'	2,290,186	72,819	2,217,367	12
West and East Cell - 200'	6,540,186	72,819	6,467,367	36

Notes:
(a) Source: Landfill Capacity Analysis for DSWM Active Landfills as of July 1, 2024 – prepared by Arcadis-U.S., Inc., October 30, 2024.

CONCEPTUAL COST ESTIMATES

Arcadis prepared conceptual level closure cost estimates for each scenario. The cost estimates were prepared using the last recalculated cost estimate used for financial assurance purposes, which was prepared in January 2020 for DSWM's fiscal year 2019. The following changes were made to that cost estimate:

- Each unit cost was escalated to 2025 prices assuming an annual inflation rate of 3%.
- The contingency was increased from 10% to 30% because these cost estimates may be used for planning purposes, which require higher contingencies than financial assurance estimates.
- The 3-D area of the cell area was used to account for the revising grading plan, however the difference in 3-D area between grading scenarios was minimal (i.e., < 1%).
- Certain quantities were increased to account for larger areas of steep slopes. Some of these include stormwater benches and geonet.

Table 2 – Conceptual Closure Cost Estimates

Grading Scenario	Closure Estimate
East Cell Only - 170'	$30,000,000
West and East Cell - 170'	$59,000,000
East Cell Only - 200'	$31,100,000
West and East Cell - 200'	$61,200,000

Additional cost estimates requested by DWSM include the construction of a Class III liner of the West Cell. The following key assumptions were made for this cost estimate:

- The entre West Cell, including side slopes, will have a Class III liner built over it. Although the side slopes were included for this analysis, a geotechnical stability analysis will need to be performed to determine if this is a realistic option.
- The cross section of the Class III liner was assumed to be similar to the original East Cell liner, which is documented in the North Dade Landfill Expansion construction drawings prepared by Brown and Caldwell, 1989. The cross section consists of the following layers (from top to bottom):
    - Leachate collection and protective layer (2 feet of sand)
    - Composite drainage net
    - 80-mil HDPE liner
    - 16-oz non-woven geotextile
    - Granular base material (depth varies)
    - Geogrid
- A significant amount of granular base material will need to be placed over the West Cell topdeck to maintain minimal cross slopes after settlement of the underlying waste material. Based on the construction drawings for the East Cell, the difference in elevations between the middle of the cell and the outside of the cell was approximately 10 vertical feet. Therefore, it was assumed an average depth of 5 feet (10 feet on the outside, 0 feet on the inside) would be necessary.

The conceptual level cost estimate for the construction of a Class III liner over the West Cell is approximately $64,000,000.

Finally, DSWM requested cost estimates for the additional landfill gas collection system for all scenarios. These were calculated using the previous financial assurance cost estimate with the aforementioned price increases for inflation and contingency along with the following additional modifications:

- For the East Cell, the piping quantities were increased by 25 and 40% for the 170’ and 200’ scenarios, respectively, to account for the extended landfill height.
- For the combined West Cell and East Cell scenario, the total landfill gas collections costs for the East Cell scenarios were doubled to account for the additional surface area.

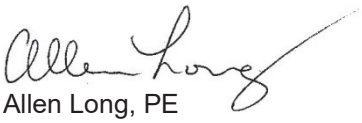
Table 3 – Conceptual Landfill Gas Collection System Cost Estimates

Grading Scenario	Landfill Gas Collection System Estimate
East Cell Only - 170'	$3,800,000
West and East Cell - 170'	$7,600,000
East Cell Only - 200'	$4,100,000
West and East Cell - 200'	$8,300,000

John Wong
Department of Solid Waste Management
March 14, 2025

Please contact us at the contact information below if you have any questions.

Sincerely,
Arcadis U.S., Inc.

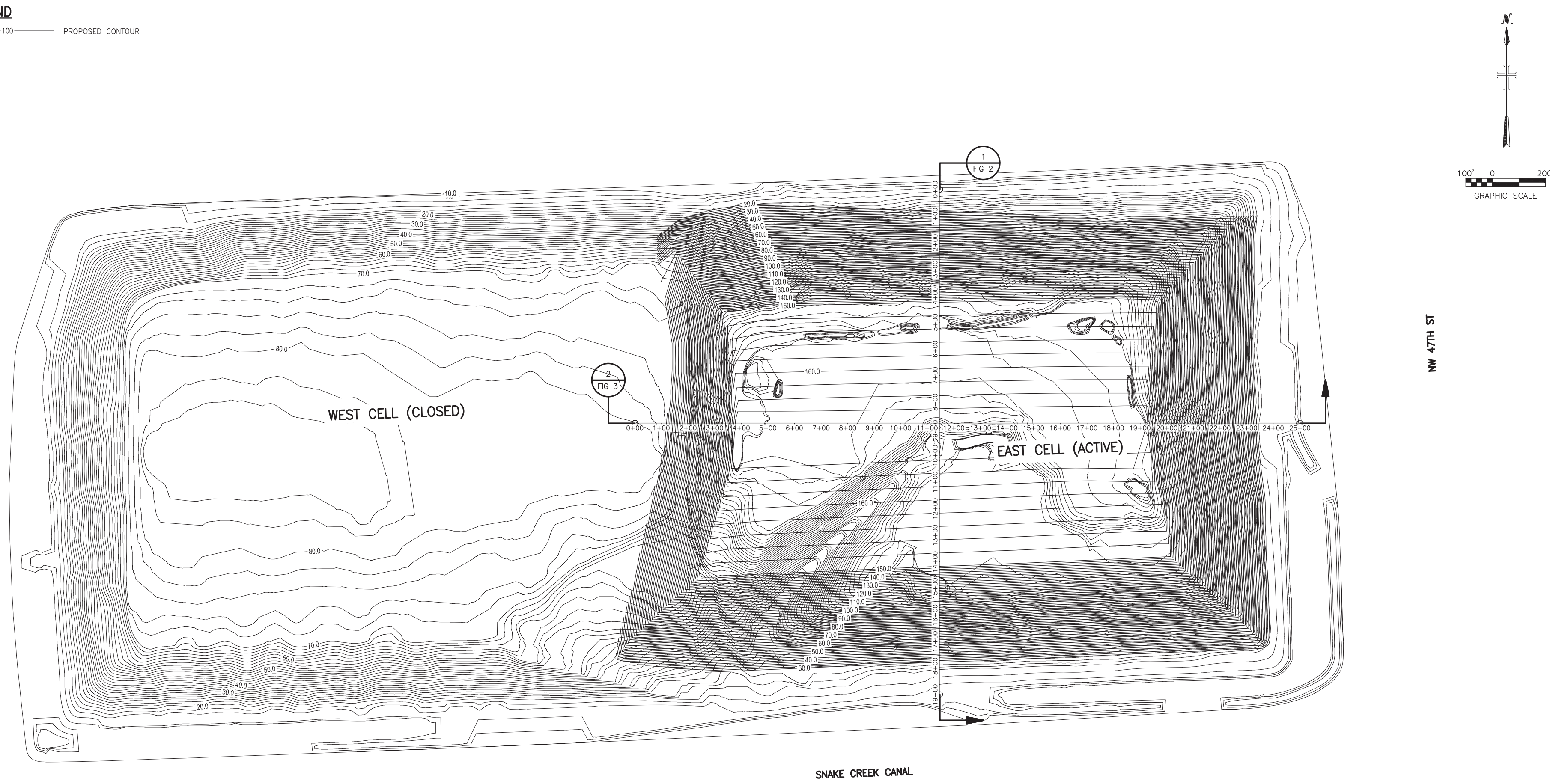


Allen Long, PE
Principal Civil Engineer
Florida PE No. 66724

Email: allen.long@arcadis.com
Direct Line: 724.934.9562
Mobile: 724.466.3355

LEGEND

——100—— PROPOSED CONTOUR



ARCADIS Design & Consultancy for natural and built assets

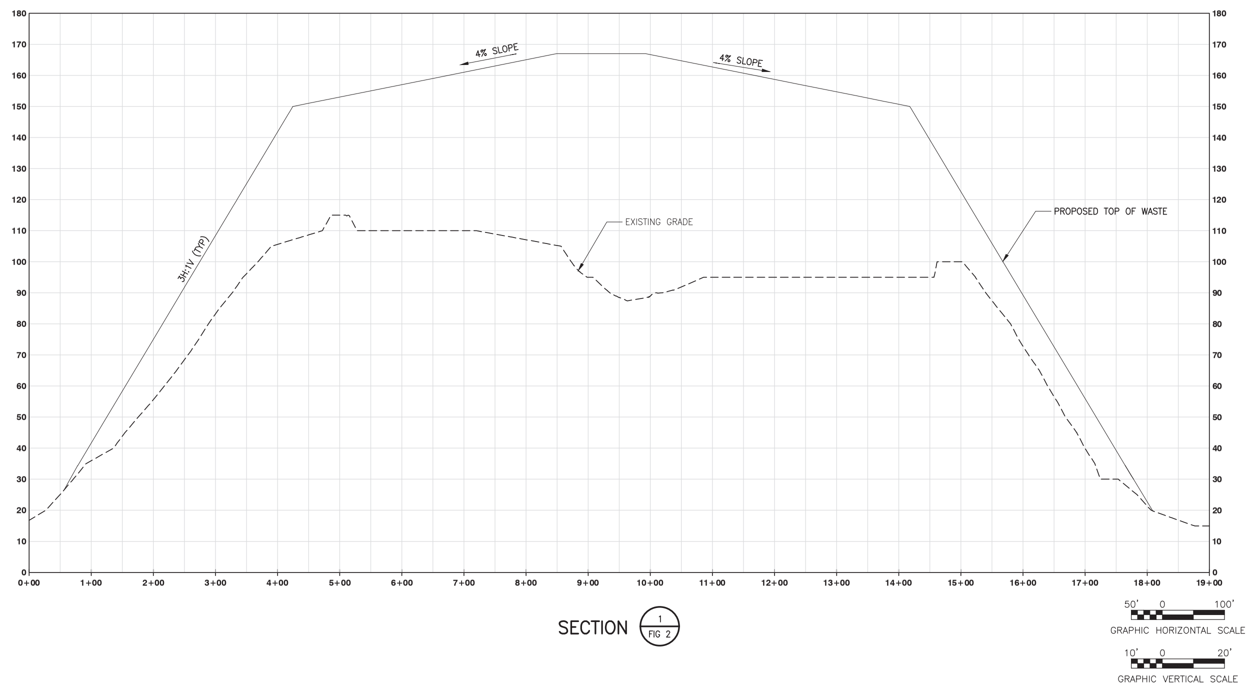
MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION

30238003

NORTH DADE LANDFILL SITE PLAN

FIGURE 1



LEGEND

——— PROPOSED FINAL COVER

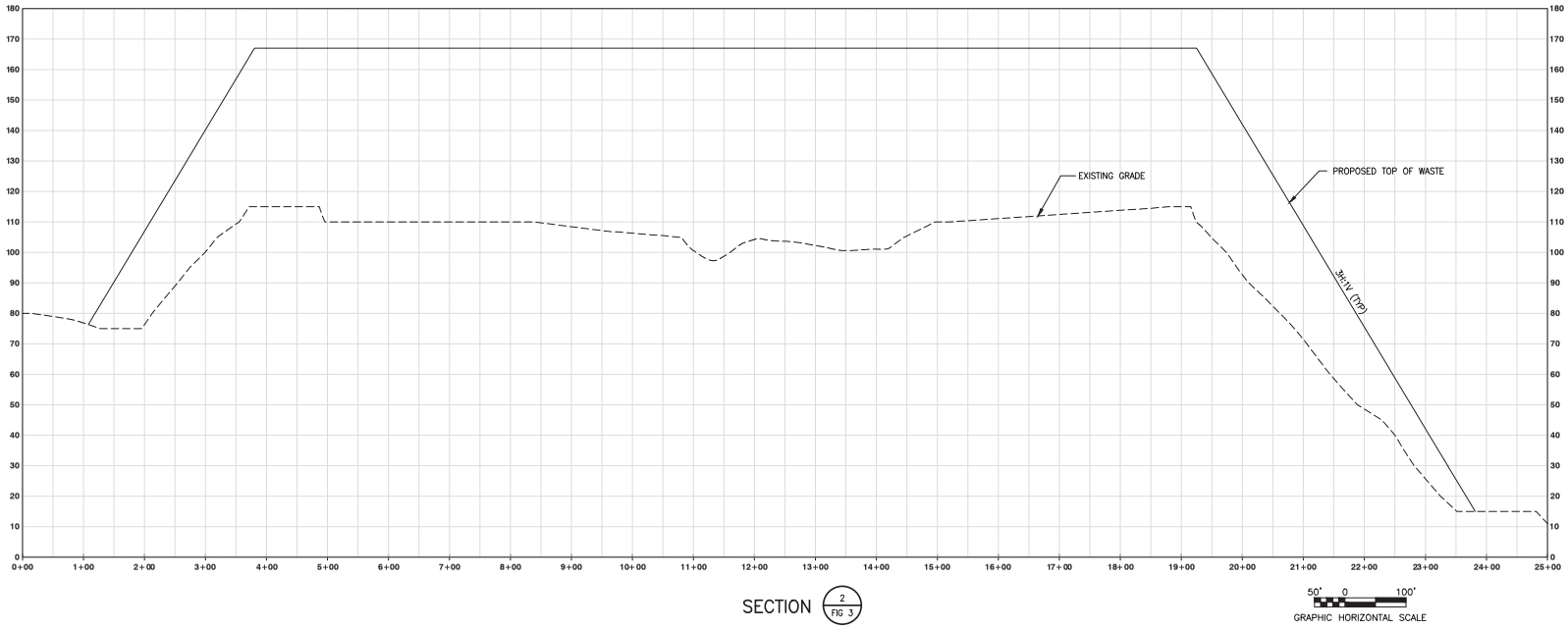
— — — EXISTING GRADE

MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

NORTH DADE LANDFILL SITE PLAN
FIGURE 2

MDC080



SECTION 2 / FIG 3

LEGEND

PROPOSED FINAL COVER

EXISTING GRADE

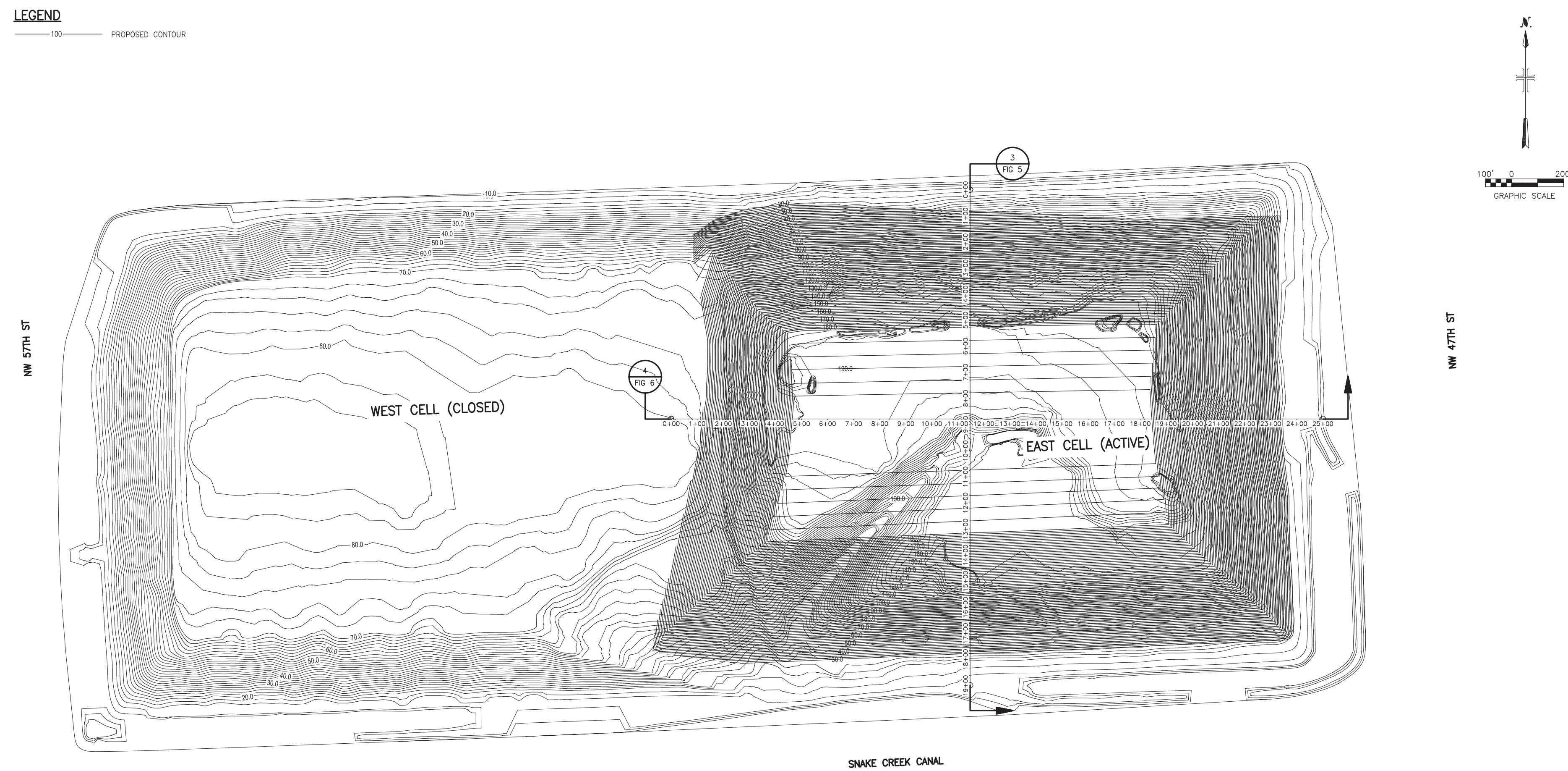
MIAMI–DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

NORTH DADE LANDFILL SITE PLAN
FIGURE 3

MDC081

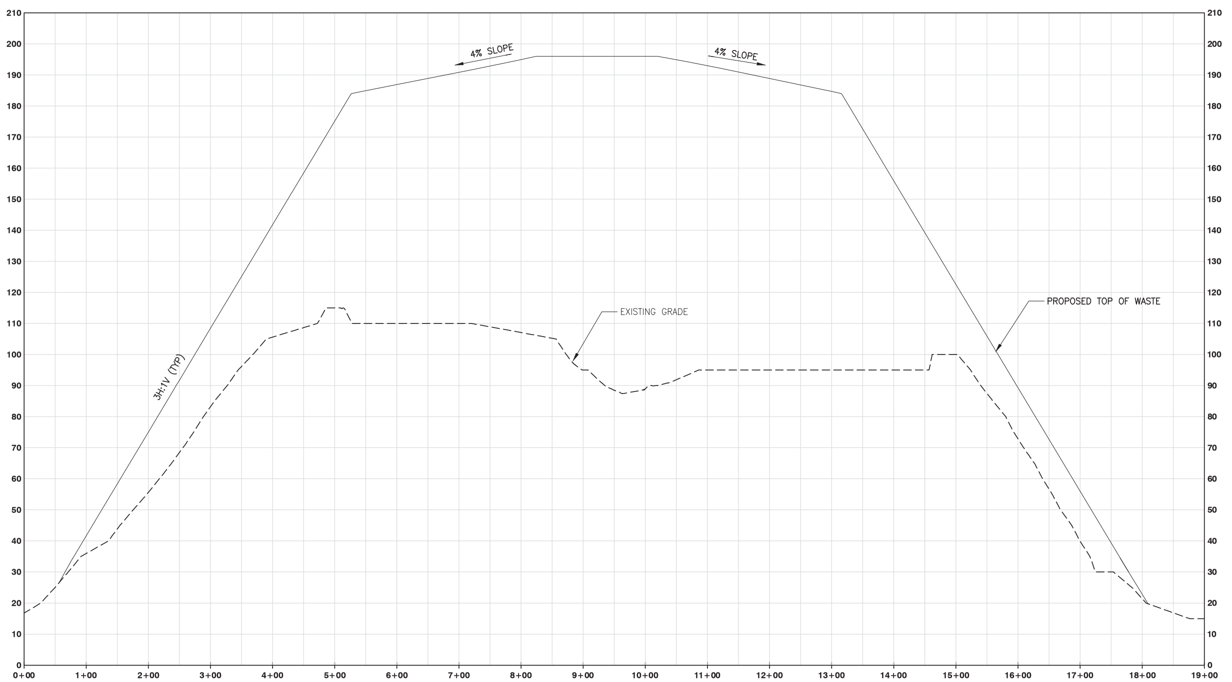
User: B. deCiercq C:\Users\MJohnston\ARCADIS\PT-64706804 - Miami Dade County DSWM PWWM - 30229246 - FY24 Task 500 - LF Capacity Report\CAD\2025_NDL\Vertical Expansion\NDL SITE PLAN 2025\EX-NDL-SITE-PLAN 2025_E167.dwg SAVED: 3/7/2025 9:14 AM



MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

NORTH DADE LANDFILL SITE PLAN
FIGURE 4



SECTION 3 / FIG 5

50' 0 100'
GRAPHIC HORIZONTAL SCALE

10' 0 20'
GRAPHIC VERTICAL SCALE

LEGEND

——— PROPOSED FINAL COVER
— — — EXISTING GRADE

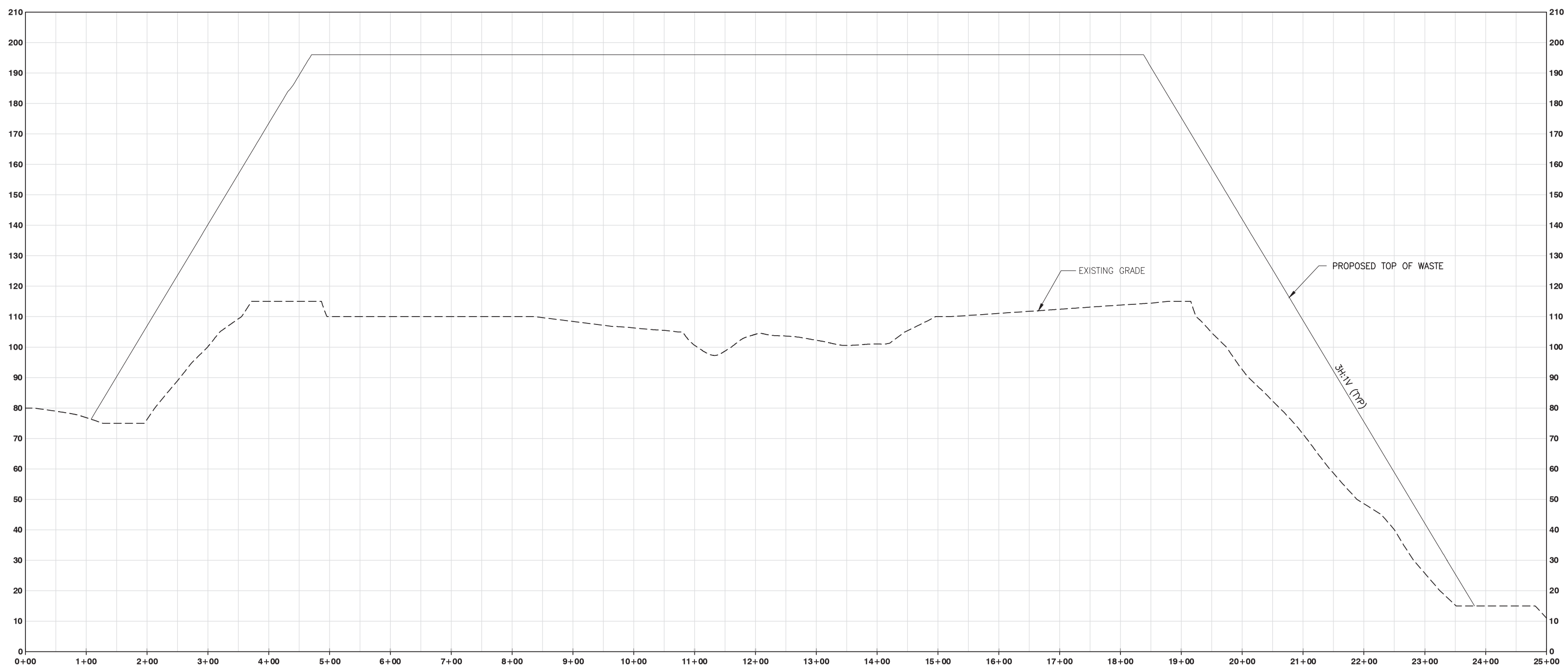
ARCADIS Design & Consultancy for natural and built assets

MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

NORTH DADE LANDFILL SITE PLAN
FIGURE 5

MDC083



SECTION 4 / FIG 6

50' 0 100'
GRAPHIC HORIZONTAL SCALE

10' 0 20'
GRAPHIC VERTICAL SCALE

LEGEND

——— PROPOSED FINAL COVER
— — — EXISTING GRADE

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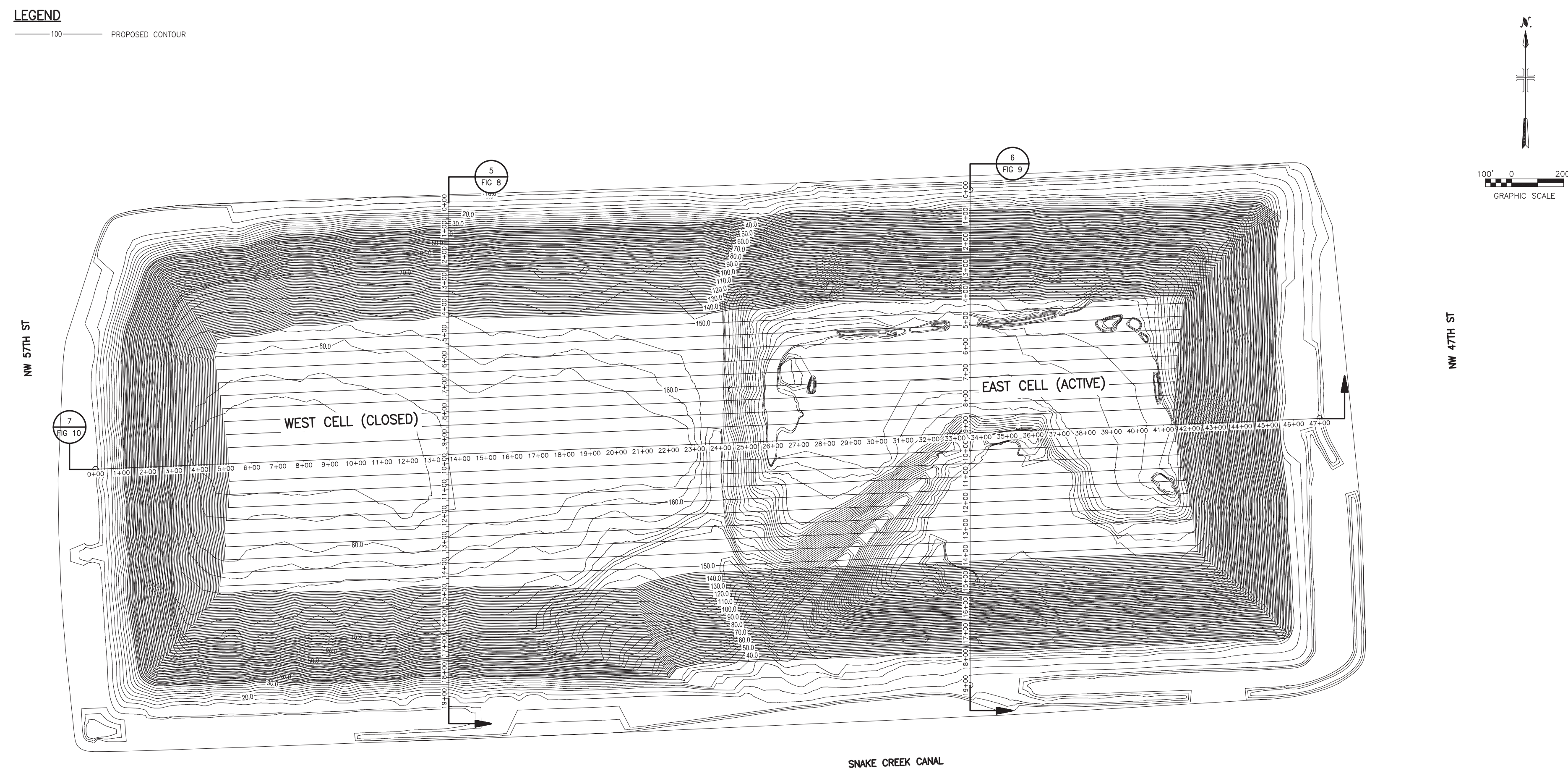
MIAMI–DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

NORTH DADE LANDFILL SITE PLAN
FIGURE 6

MDC084



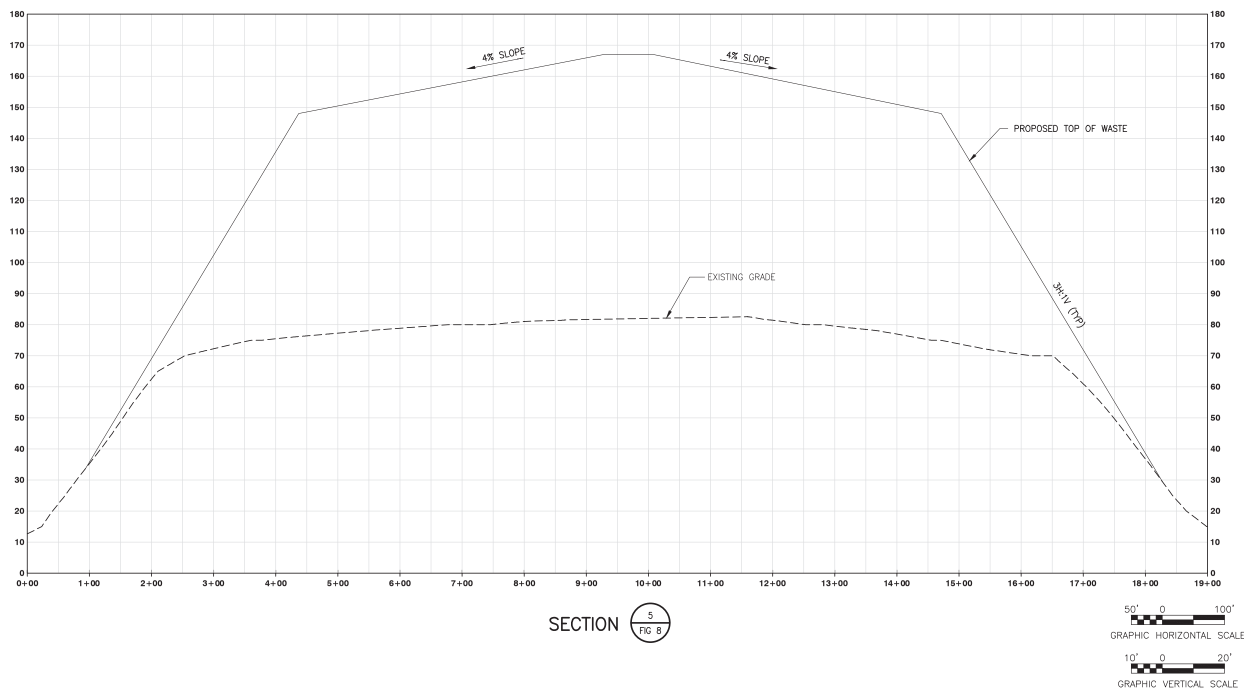
MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

ARCADIS Design & Consultancy for natural and built assets

NORTH DADE LANDFILL SITE PLAN
FIGURE 7

MDC085



LEGEND

PROPOSED FINAL COVER

EXISTING GRADE

ARCADIS Design & Consultancy for natural and built assets

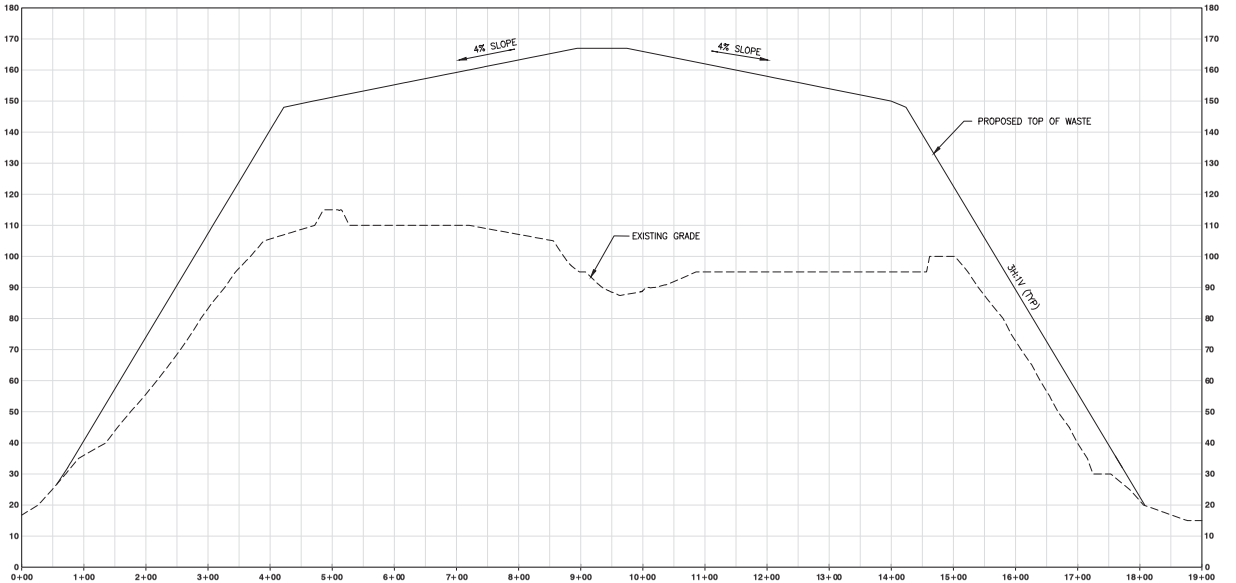
MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

NORTH DADE LANDFILL SITE PLAN
FIGURE 8

MDC086

User: B. deClercq C:\Users\Mdrischer\ARCADIS\PF-64706604 – Miami Dade County DSWM PWWM – 30229246 – FY24 Task 500 – LF Capacity Report\CAD\2025 2025\EX-ND-SITE-PLAN 2025_All 167.dwg SAVED: 2/14/2025 3:13 PM



SECTION 6 / FIG 9

50' 0 100'
GRAPHIC HORIZONTAL SCALE

10' 0 20'
GRAPHIC VERTICAL SCALE

LEGEND

PROPOSED FINAL COVER

EXISTING GRADE

MDC087

User: B. deCiercq C:\Users\MJohnsher\ARCADIS\PT-64706804 - Miami Dade County DSWM PWWM - 30229246 - FY24 Task 500 - LF Capacity Report\CAD\2025 NF\Work Products\NDL SITE PLAN 2025\EX-NDL-SITE-PLAN 2025_All 167.dwg SAVED: 2/14/2025 3:13 PM

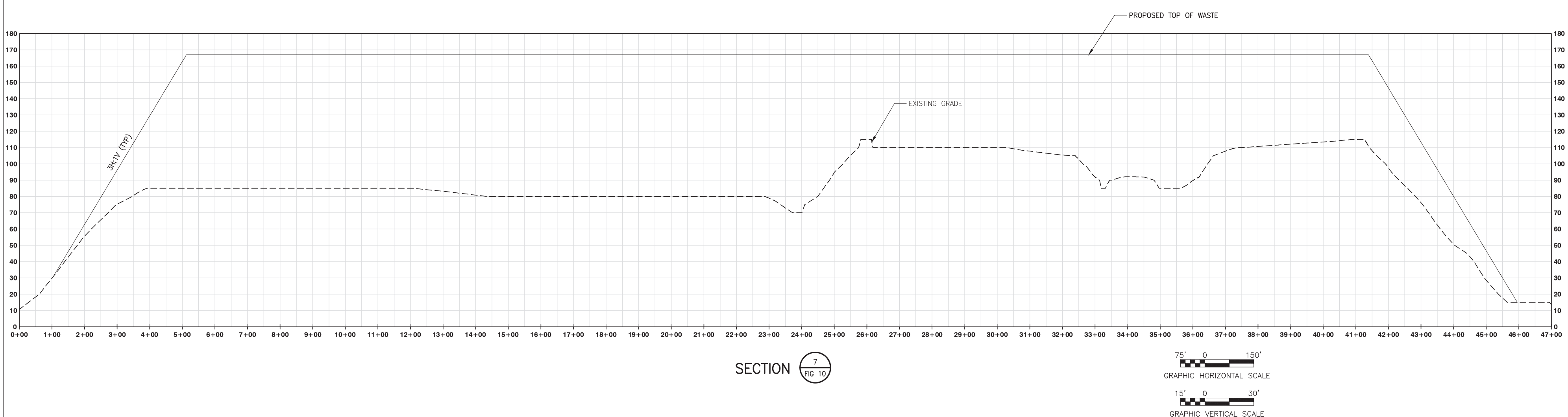
ARCADIS

MIAMI–DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

NORTH DADE LANDFILL SITE PLAN
FIGURE 9

MDC088



LEGEND

PROPOSED FINAL COVER

EXISTING GRADE

ARCADIS Design & Consultancy for natural and built assets

MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION

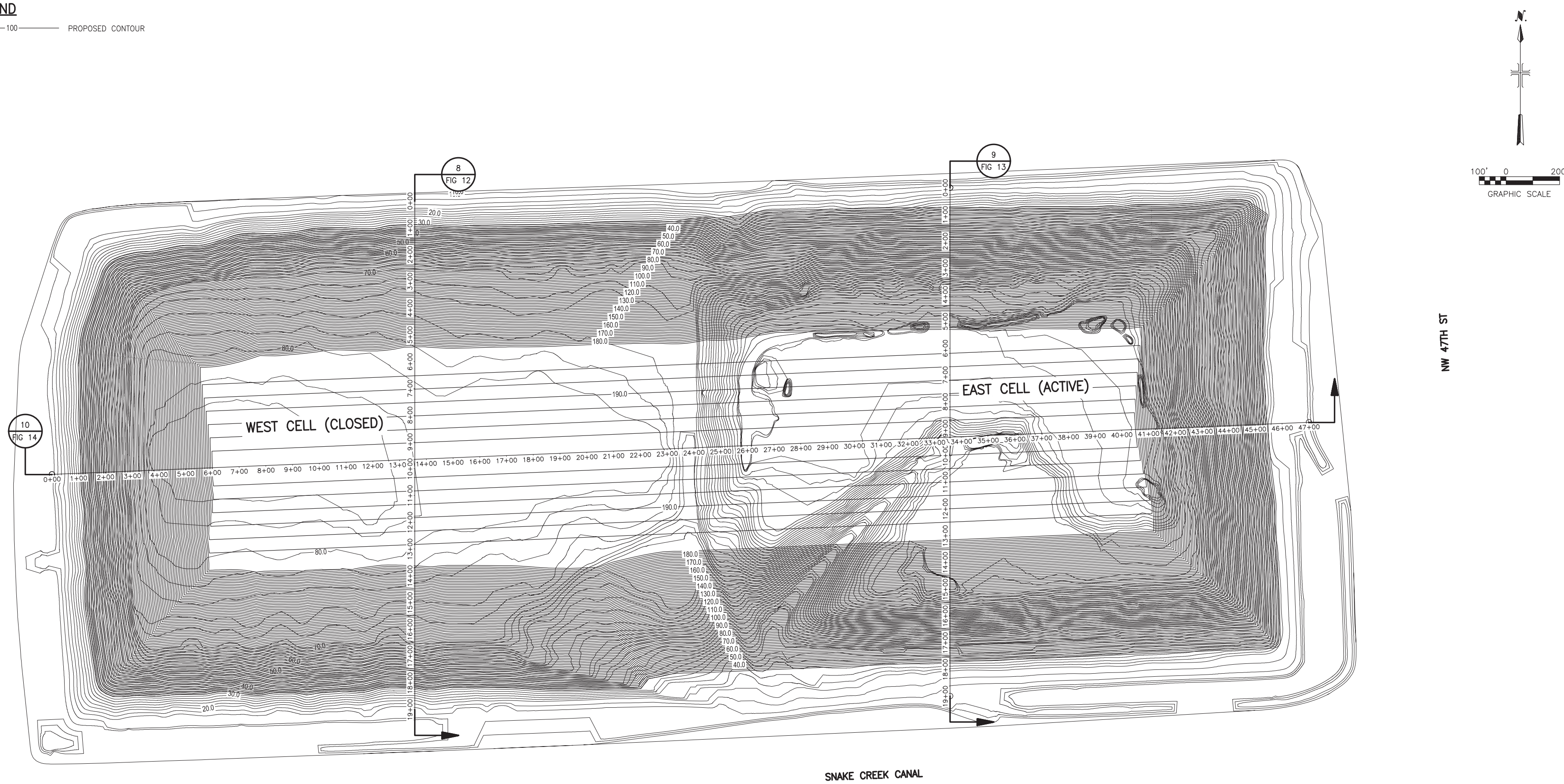
30238003

NORTH DADE LANDFILL SITE PLAN

FIGURE 10

LEGEND

——100—— PROPOSED CONTOUR



MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION

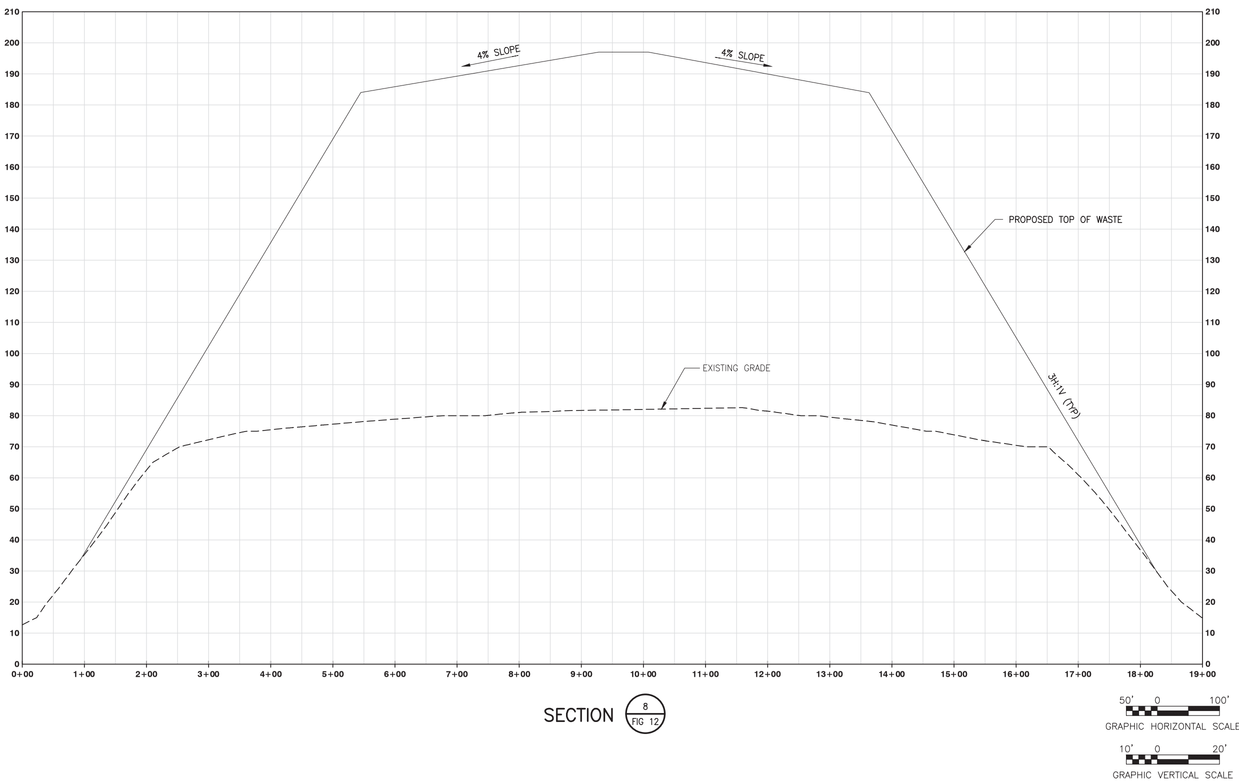
30238003

NORTH DADE LANDFILL SITE PLAN

FIGURE 11

ARCADIS Design & Consultancy for natural and built assets

MDC089



LEGEND

PROPOSED FINAL COVER

EXISTING GRADE

ARCADIS Design & Consultancy for natural and built assets

MIAMI-DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

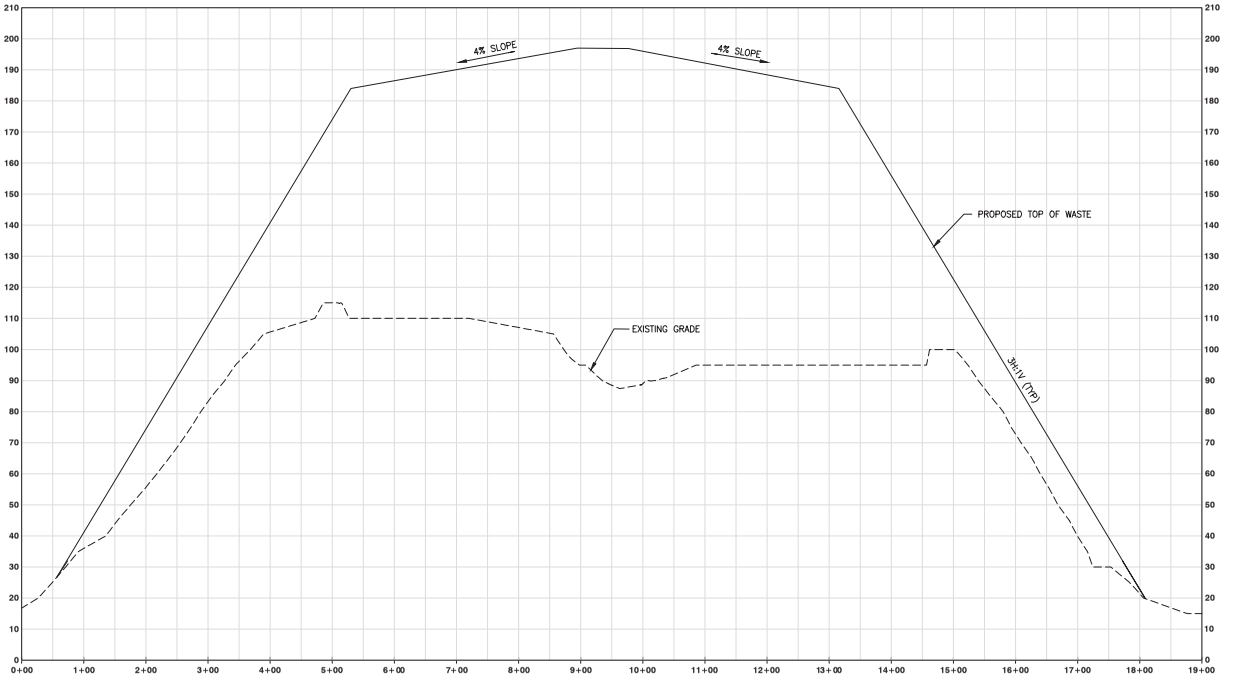
NDL VERTICAL EXPANSION

30238003

NORTH DADE LANDFILL SITE PLAN

FIGURE 12

MDC090



SECTION 9 / FIG 13

50' 0 100'
GRAPHIC HORIZONTAL SCALE

10' 0 20'
GRAPHIC VERTICAL SCALE

LEGEND

PROPOSED FINAL COVER
EXISTING GRADE

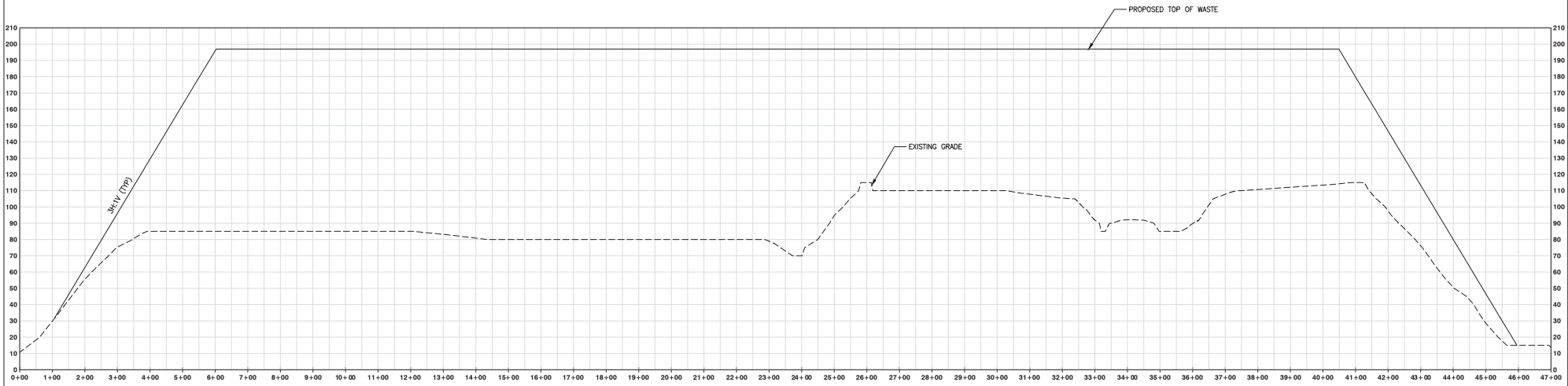
MDC091

MIAMI–DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

NORTH DADE LANDFILL SITE PLAN
FIGURE 13

User: B. deCiercq C:\Users\MDrischer\ARCADIS\PT-64706804 - Miami Dade County DSWM PWWM - 30229246 - FY24 Task 500 - LF Capacity Report\CAD\2025_NDL_Vertical_Expansion\SITE PLAN 2025\EX-NDL-SITE-PLAN 2025_All 197.dwg SAVED: 2/13/2025 2:04 PM



SECTION 10 / FIG 14

75' 0 150'
GRAPHIC HORIZONTAL SCALE

15' 0 30'
GRAPHIC VERTICAL SCALE

LEGEND

PROPOSED FINAL COVER

EXISTING GRADE

MDC092

User: B. deCiercq C:\Users\MWhitcher\ARCADIS\PT-64706804 - Miami Dade County DSWM PWWM - 30229246 - FY24 Task 500 - LF Capacity Report\CAD\2025\[X-MD-SITE-PLAN 2025_All 197.dwg SAVED: 2/13/2025 2:04 PM

MIAMI–DADE COUNTY DEPARTMENT OF SOLID WASTE MANAGEMENT

NDL VERTICAL EXPANSION
30238003

NORTH DADE LANDFILL SITE PLAN
FIGURE 14

Exhibit 3.3

Landfill Optimization Financial Analysis

Exhibit 3.3- Landfill Optimization Financial Analysis

North Dade Landfill

Optimization Descriptions	Airspace Gained in Tons	Additional Life in Years	Capital Costs (Includes Cell Const., Gas System, Capping & PC Costs)	Capital Costs/Ton	Operating Costs/Ton	Total Cost/Ton	Tip Fee/Ton	Net Rev/Ton	**Landfill Expansion** Net Revenue (Tip Fee Less CIP and Operating Expense)	**No Landfill Expansion** Net Haul Out Cost (Tip Fee Less Transportation and 3rd Party Disposal Cost)
East Cell 84 Acres @ 138' - 170'	1,540,186	8.6	$ 33,800,000	$ 21.95	$ 39.94	$ 61.89	$ 74.40	$ 12.51	$ 19,274,810	($32,420,915.30)
East Cell 84 Acres @ 138'-200'	2,290,186	12.7	$ 35,200,000	$ 15.37	$ 39.94	$ 55.31	$ 74.40	$ 19.09	$ 43,719,810	($48,208,415.30)
East and West Cell 180 Acres @ 170'	5,040,186	28.0	$ 66,600,000	$ 13.21	$ 39.94	$ 53.15	$ 74.40	$ 21.25	$ 107,084,810	($106,095,915.30)
East and West Cell 180 Acres@ 200'	6,540,186	36.3	$ 69,500,000	$ 10.63	$ 39.94	$ 50.57	$ 74.40	$ 23.83	$ 155,874,810	($137,670,915.30)

Annual Landfill Disposal Tons = 180,000
Status Quo will result in NDL closing in 5 Years - the minimum time required to build a Transfer Station is 6 Years and $50M Capex
DSWM load and Transport to Rail Intermodal ($/ton) $23.30
3rd Party Rail and Disposal ($/ton) $72.15

South Dade Landfill

Optimization Descriptions	Airspace Gained in Tons	Additional Life in Years	Capital Costs (Includes Cell Const., Gas System, Capping & PC Costs)	Capital Costs/Ton	Operating Costs/Ton	Total Cost/Ton	Tip Fee/Ton	Net Rev/Ton	**Landfill Expansion** Net Revenue (Tip Fee Less CIP and Operating Expense)	**No Landfill Expansion** Net Haul Out Cost (Tip Fee Less Transportation and 3rd Party Disposal Cost)
Horizontal Expansion 5 Acres @140'	1,047,941	2.1	$ 36,600,000	$ 34.93	$ 16.41	$ 51.34	$ 74.40	$ 23.06	$ 24,170,099	($22,059,158.05)
Vertical expansion 106 Acres (Cells 4 and 5 @147'-250')	3,887,427	7.8	$ 25,845,000	$ 6.65	$ 16.41	$ 23.06	$ 74.40	$ 51.34	$ 199,586,892	($81,830,338.35)
Combined Vertical & Horizontal	4,935,368	10	$ 62,445,000	$ 12.65	$ 16.41	$ 29.06	$ 76.40	$ 47.34	$ 233,627,726	($94,018,760.40)

Annual Landfill Disposal Tons = 500,000
Status Quo will result in SDL closing in 4 Years - the minimum time required to build a Transfer Station is 6 Years and $ $50M Capex
DSWM load and Transport to Rail Intermodal ($/ton) $23.30
3rd Party Rail and Disposal ($/ton) $72.15

Exhibit 3.4

FAA Determination:
No Hazard to Air Navigation

EXHIBIT 3.4

Federal Aviation Administration
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-0520

Aeronautical Study No.
2007-ASO-6855-OE

Issued Date: 01/07/2008

Lee Casey
MDC Department of Solid Waste Management
2525 NW 62 Street, 5th Floor
Miami, FL 33147

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Landfill North Miami-Dade Landfill
Location:	Miramar, FL
Latitude:	25-58-12.84N NAD 83
Longitude:	80-17-38.79W
Heights:	270 feet above ground level (AGL) 290 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, 24-hr med-strobes - Chapters 4,6(MIWOL),&12.

It is required that the enclosed FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

____ At least 10 days prior to start of construction (7460-2, Part I)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

See attachment for additional condition(s) or information.

This determination expires on 07/07/2009 unless:

(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE POSTMARKED OR DELIVERED TO THIS OFFICE AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE.

This determination is subject to review if an interested party files a petition that is received by the FAA on or before Febuary 06, 2008. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted in triplicate to the Manager, Airspace and Rules Division - Room 423, Federal Aviation Administration, 800 Independence Ave., Washington, D.C. 20591.

This determination becomes final on Febuary 16, 2008 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Office of Airspace and Rules via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

A copy of this determination will be forwarded to the Federal Communications Commission if the structure is subject to their licensing authority.

If we can be of further assistance, please contact Michael Blaich, at (404) 305-7077. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2007-ASO-6855-OE.

Signature Control No: 550664-101480802 (DNH)
Kevin P. Haggerty
Manager, Obstruction Evaluation Service

Attachment(s)
Additional Information
Map(s)

7460-2 Attached

MDC098

Additional information for ASN 2007-ASO-6855-OE

Proposal: To increase the height of a Landfill from a height of 135 feet above ground level, 155 feet above mean sea level to a height of 270 feet above ground level, 290 feet above mean sea level.

Location: The structure will be located approximately 3.43 nautical miles southwest of the North Perry Airport (HWO) reference point.

Exceeds FAR Part 77.23(a)(2) by 27 feet, a height more than 243 feet above ground level with respect to the HWO Airport.

An aeronautical study for Visual Flight Rules (VFR) disclosed that the proposed structure would not affect VFR navigation. The proposed structure would have to exceed 500 feet Above Ground Level (AGL) to penetrate the vertical confines of any VFR route.

The proposed structure was found to have no substantial adverse effect on the VFR traffic patterns in the vicinity of the site.

Details of the structure were not circularized to the aeronautical public for comment.

The impact on arrival, departure, and en route procedures for aircraft operating under VFR/IFR conditions at existing and planned public use airports, as well as aeronautical facilities, was considered during the analysis of the structure.

The aeronautical study disclosed that the structure, at the height shown on page 1 of this determination, would have no substantial adverse effect upon any terminal or en route instrument procedure or altitude.

The cumulative impact resulting from the structure, when combined with the impact of other existing or proposed structures was considered and found to be acceptable.

Therefore, it is determined that the structure will have no substantial adverse effect upon the safe and efficient utilization of the navigable airspace by aircraft or on the operation of navigational facilities and would not be a hazard to air navigation.

MDC099

Verified Map for ASN 2007-ASO-6855-OE

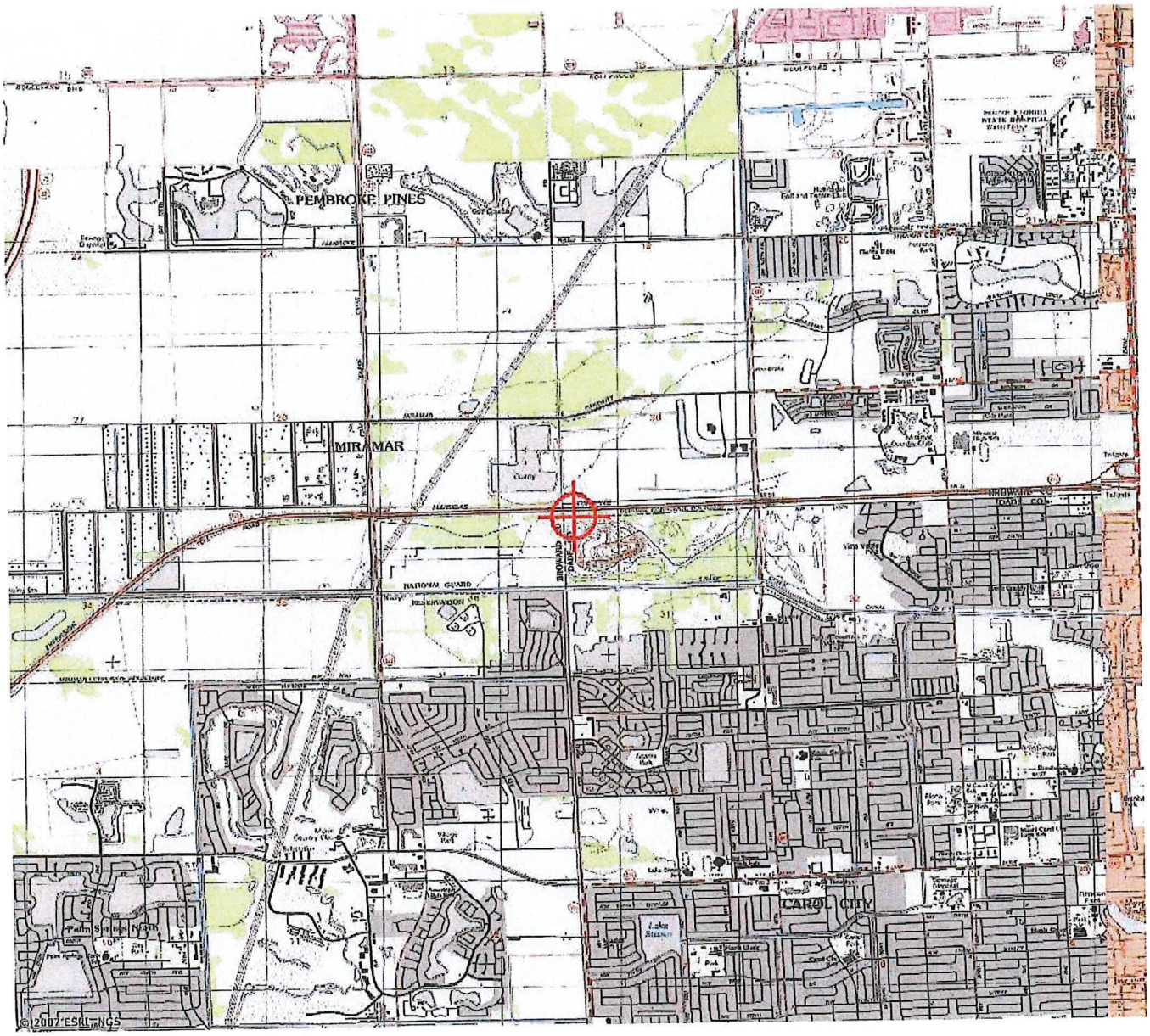


Exhibit 3.5

SDL Optimization Scenarios (MEC Engineering)

EXHIBIT 3.5

From: Jeff Thompson <jeff@mec-e.com>
Sent: Friday, February 7, 2025 6:59 PM
To: Wong, John (DSWM) <John.Wong@miamidade.gov>
Cc: Kadambala, Ravi (DSWM) <Ravi.Kadambala@miamidade.gov>; King, Richard (DSWM) <Richard.King@miamidade.gov>; Shorunke-Jean, Bolanle O. (DSWM) <Bolanle.Shorunke-Jean@miamidade.gov>
Subject: RE: SDL Expansion Options

EMAIL RECEIVED FROM EXTERNAL SOURCE

Hi John, please see the attached (very) preliminary conceptual plans showing 200' and 250' vertical expansion option, along with opinion of cost for the additional capping for the vertical expansion options, sketches with the basis of the opinion of cost, and site life estimates based on the additional capacity.

To summarize:

- A vertical expansion of Cells 4&5 to 200' will add about 3.5M CY of capacity, extending the life 3.8 years, and adding $1.1M to capping cost.
- A vertical expansion to 250' will add about 7.0M CY of capacity, extending the life 7.8 years, and adding $1.8M to capping costs.
- Horizontal expansion of Cell 6 will be limited to about 140' based on geometry (assuming relocation of scale house to near leachate treatment and keeping leachate treatment) add about 1.9M CY of capacity and will extend life 2 years.

Note that from our preliminary calculations we have a high level of confidence that 200' vertical expansion is feasible, and a medium/high level of confidence that the 250' vertical expansion is feasible, but we still need to perform the supporting calculations in coordination with our geotechnical subcontractor.

Also note that we found that cost for the gas collection system will not be substantially increased based on either vertical expansion option.

Sorry for not getting this to you yesterday, as I expected. Please feel free to contact (including over this weekend) if you have any questions or comments on any of this.

Thanks,

Jeff

Jeffrey P. Thompson, P.E.
President at MEC Engineering

Phone 786-999-3568 **Email** jeff@mec-e.com
Address 2100 Coral Way, Suite 705, Coral Gables, FL 33145
Web www.mec-e.com

From: Wong, John (DSWM) <John.Wong@miamidade.gov>
Sent: Thursday, January 30, 2025 3:02 PM
To: Jeff Thompson <jeff@mec-e.com>
Cc: Kadambala, Ravi (DSWM) <Ravi.Kadambala@miamidade.gov>; King, Richard (DSWM) <Richard.King@miamidade.gov>; Shorunke-Jean, Bolanle O. (DSWM) <Bolanle.Shorunke-Jean@miamidade.gov>
Subject: SDL Expansion Options

Hi Jeff

Summarize our request vertical and horizontal.

1. At 200', additional capacity in CY and site life (yrs) based on 500K tons/yr with density in Arcadis capacity report; additional capping cost estimates and gas collection system.
2. At 250', additional capacity in CY and site life (yrs) based on 500K tons/yr with density in Arcadis capacity report; additional capping cost estimates and gas collection system.

If Max vertical elevation is available based on geotechnical analysis, then only state what max height for cell 4, 5, and 6. Available Feb 10 Monday for review.

John Wong, Assistant Director
Department of Solid Waste Management
Technical Services and Environmental Affairs
Office: (305) 514-6663
Mobile: (786) 717-4425
Email: John.Wong@Miamidade.gov

SOUTH DADE LANDFILL

LANDFILL OPTIMIZATION ANALYSIS

Cell 6 elevation 140 ft

Cell 4 5 elevation 200 ft

	Additional Volume	Waste Conversion Factor	Additional Capacity	Projected Waste Intake	Aditional Site Life
Expansion Area	cubic yards	tons/cubic foot	tons	tons	years
CELL 6 - Lateral Expansion	1,905,348	0.55	1,047,941.40	500,000	2.096
CELL 4 & 5 Vertical Expansion	3,472,414	0.55	1,909,827.70	500,000	3.820
					5.916

SOUTH DADE LANDFILL

LANDFILL OPTIMIZATION ANALYSIS

Cell 6 elevation 140 ft

Cell 4 5 elevation 250 ft

	Additional Volume	Waste Conversion Factor	Additional Capacity	Projected Waste Intake	Additional Site Life
Expansion Area	cubic yards	tons/cubic foot	tons	tons	years
CELL 6 - Lateral Expansion	1,905,348	0.55	1,047,941.40	500,000	2.096
CELL 4 & 5 Vertical Expansion	7,068,049	0.55	3,887,426.95	500,000	7.775
					9.871

SOUTH DADE LANDFILL
LANDFILL OPTIMIZATION ANALYSIS

EXHIBIT 3.5 (2)

Preliminary
02/19/2025 3:48:33 PM

NORTH

LOCATION MAP
TOWNSHIP 56S, RANGE 40E, SECTION 21
1"=1000'

INDEX OF DRAWINGS

MDC106

Sunshine811
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Check positive response codes before you dig!

CERTIFICATION

JEFFREY P. THOMPSON, P.E., FL LICENSE NO. 69239

DATE	DESCRIPTION	NO

PREPARED BY
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MIAMI ENVIRONMENTAL & CIVIL ENGINEERING, LLC
ENGINEERING REGISTRY NO. 31394

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Delivering Excellence Every Day
MIAMI DADE COUNTY
DEPARTMENT OF SOLID WASTE MANAGEMENT
2525 NW 62nd STH FLOOR
MIAMI, FL 33147

PROJECT:
SOUTH DADE LANDFILL
LANDFILL OPTIMIZATION ANALYSIS

TITLE
COVER

NO.
C-1

CERTIFICATION

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MIAMI, FL 33147

PROJECT:

SOUTH DADE LANDFILL
LANDFILL OPTIMIZATION ANALYSIS

TITLE

EXISTING CONDITIONS WITH CELL 5 COMPLETED AS CURRENTLY PERMITTED

NO.

C-2

Sunshine 811
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MDC108

0 200 400 Feet

SCALE:1"=200'

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PROJECT:

SOUTH DADE LANDFILL
LANDFILL OPTIMIZATION ANALYSIS

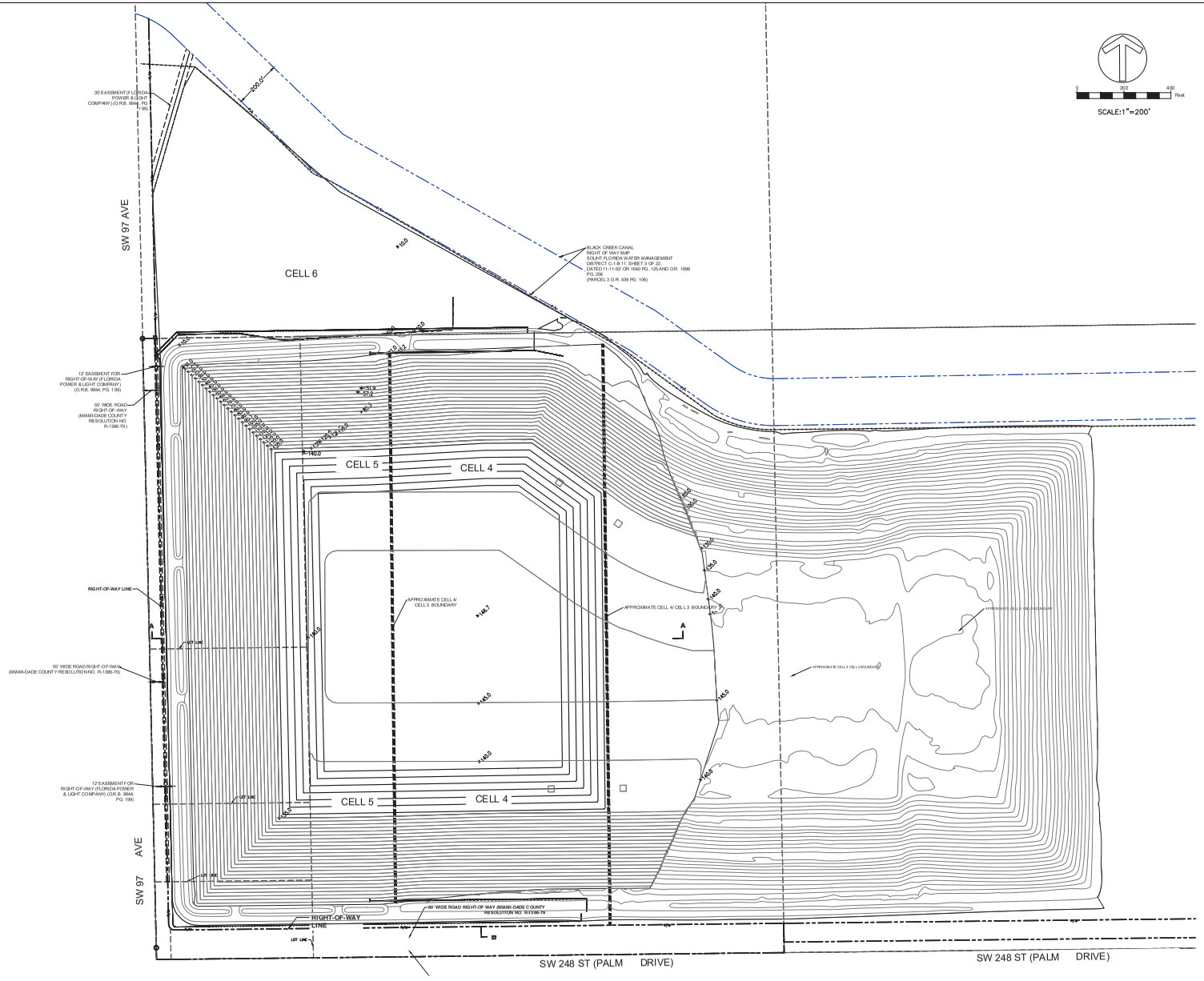
TITLE

PROPOSED CELL 4 & 5 VERTICAL EXPANSION AT 200'

NO.

C-3

MDC109



PLAN VIEW LANDFILL

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SOUTH DADE LANDFILL
LANDFILL OPTIMIZATION ANALYSIS

TITLE

PROPOSED CELL 4 & 5 VERTICAL EXPANSION AT 200'

NO.

C-4

MDC110

0 120 240 Feet
SCALE:1"=120'

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MIAMI, FL 33147

PROJECT:

SOUTH DADE LANDFILL
LANDFILL OPTIMIZATION ANALYSIS

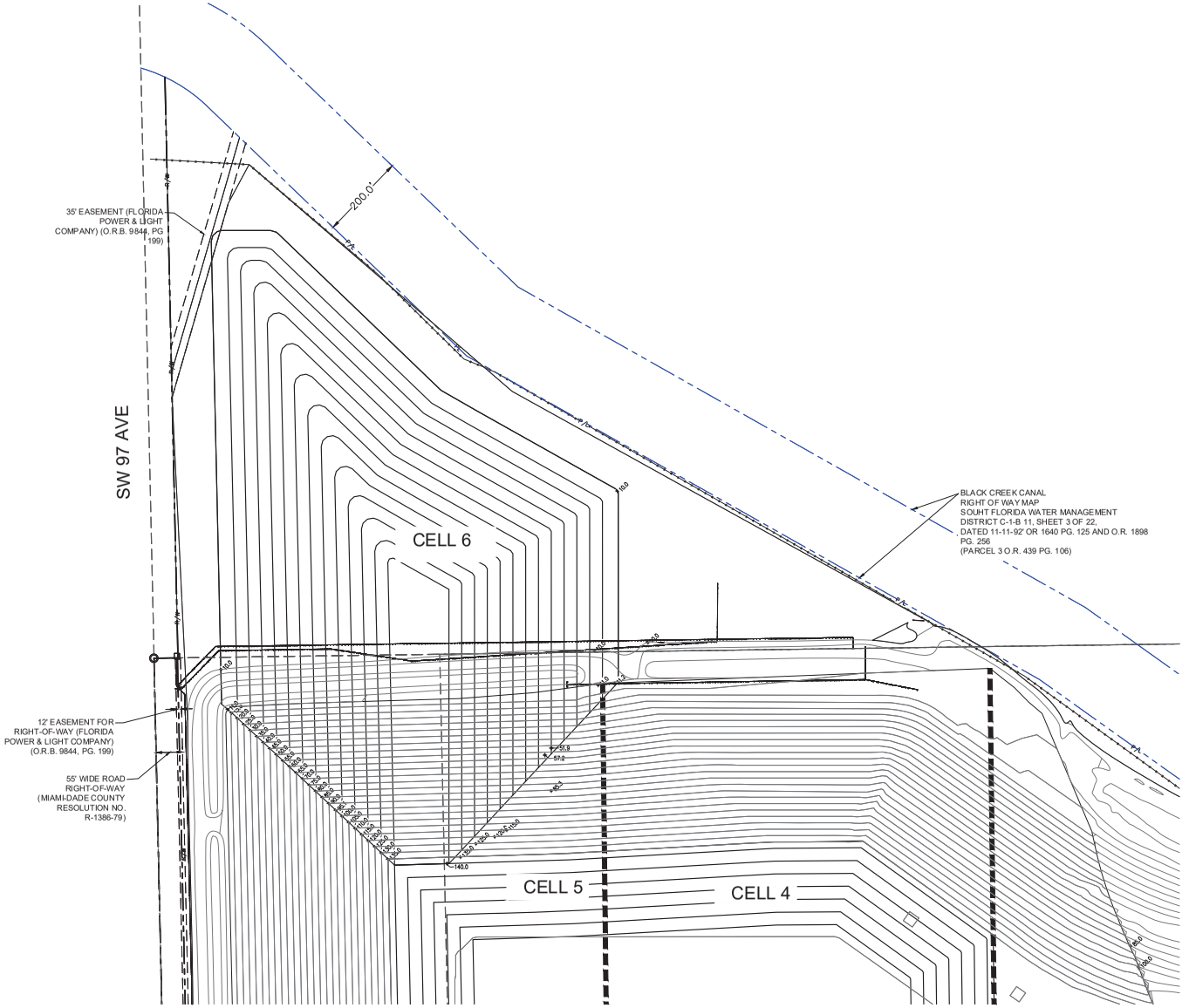
TITLE

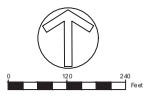
PROPOSED CELL 6 HORIZONTAL EXPANSION

NO.

C-5

MDC111





SCALE:1"=120'

PLAN VIEW LANDFILL

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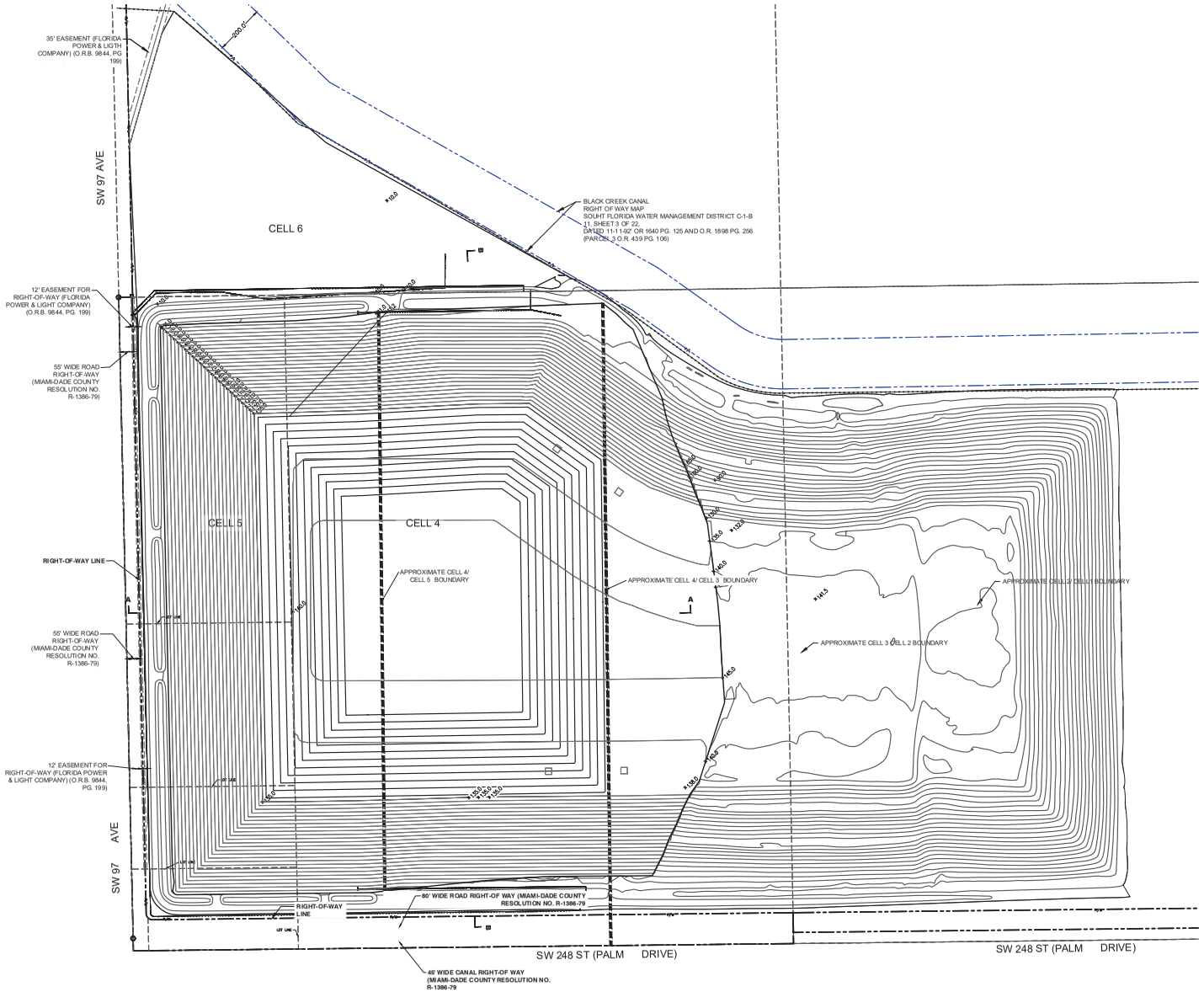
LANDFILL OPTIMIZATION ANALYSIS

TITLE

PROPOSED CELL 6 HORIZONTAL EXPANSION

NO.

C-6



MDC112

CERTIFICATION

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MIAMI, FL 33147

PROJECT:

SOUTH DADE LANDFILL
LANDFILL OPTIMIZATION ANALYSIS

TITLE

PROPOSED CELL 4 & 5 VERTICAL EXPANSION AT 250'

NO.

C-7

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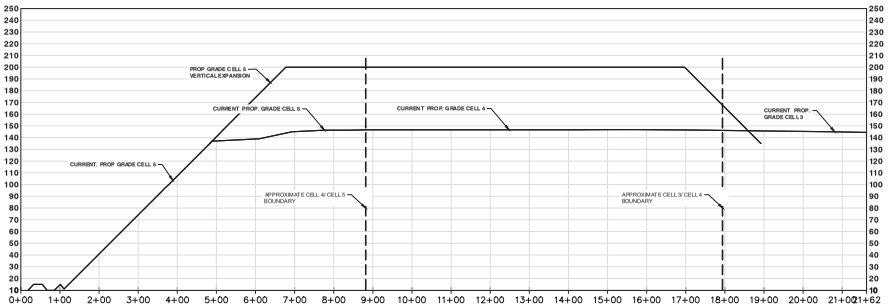
MDC113

CELL 6 HORIZONTAL EXPANSION

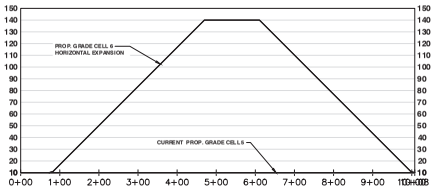
CUT/FILL SUMMARY						
NAME	CUT FACTOR	FILL FACTOR	2D AREA	CUT	FILL	NET
SURFACE CELL-6	1	1	951,696.95 Sq. Ft	291.50 Cu.Yd	1,905,640.09 Cu.Yd	1,905,348.60 Cu.Yd

CELL 4 & 5 VERTICAL EXPANSION AT 200'

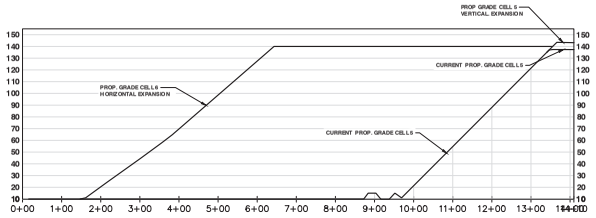
CUT/FILL SUMMARY						
NAME	CUT FACTOR	FILL FACTOR	2D AREA	CUT	FILL	NET
SURFACE--CELL-5	1	1	2,200,513.86 Sq. Ft	4,711.27 Cu.Yd	3,476,829.63 Cu.Yd	3,472,414.56 Cu.Yd



PROFILE A-A



PROFILE C-C



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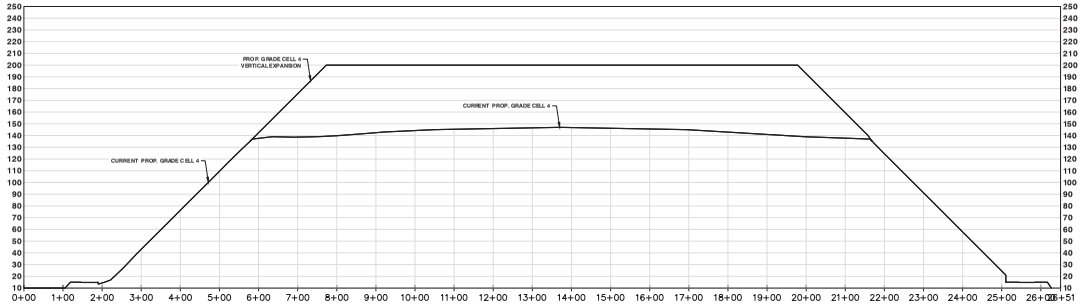
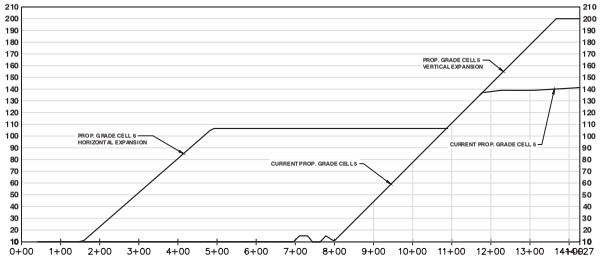


PROFILE B-B



PROFILE E-E

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MIAMI, FL 33147

PROJECT:

SOUTH DADE LANDFILL
LANDFILL OPTIMIZATION ANALYSIS

TITLE

CROSS SECTIONS VERTICAL EXPANSION AT 200'

NO.

C-8

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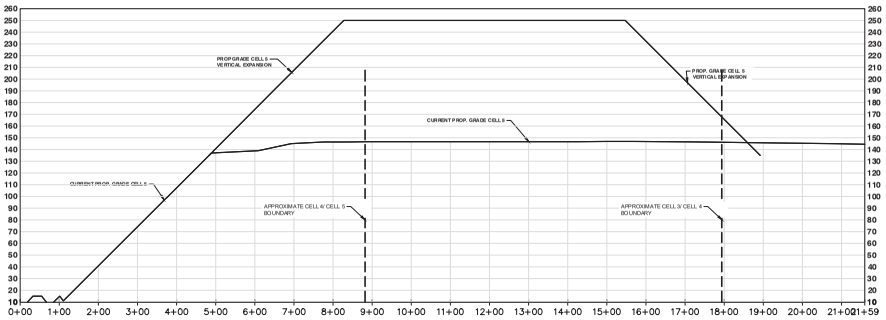
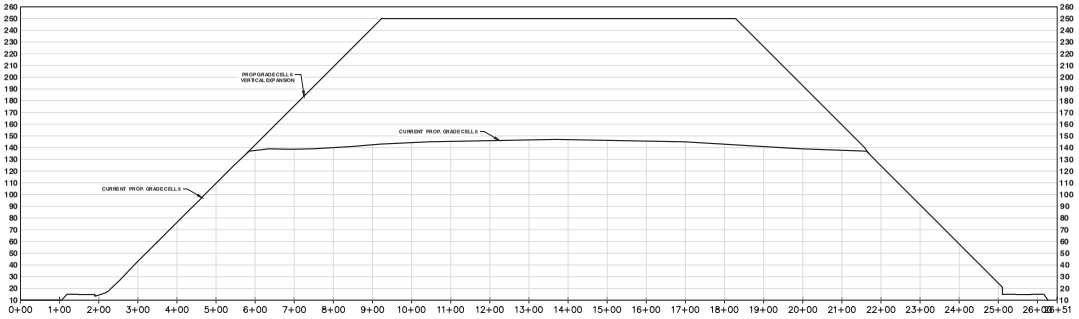
MDC114

CELL 4 & 5 VERTICAL EXPANSION AT 250'

CUT/FILL SUMMARY						
NAME	CUT FACTOR	FILL FACTOR	2D AREA	CUT	FILL	NET
SURFACE-CELL-5	1	1	2,200,513.86 Sq. Ft	4,415.07 Cu.Yd	5,167,115.68 Cu.Yd	5,162,700.61 Cu.Yd



PROFILE A-A



PROFILE B-B

CERTIFICATION

JEFFREY P. THOMPSON, P.E., FL LICENSE NO. 69239

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MIAMI, FL 33147

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SOUTH DADE LANDFILL
LANDFILL OPTIMIZATION ANALYSIS

TITLE

CROSS SECTIONS VERTICAL EXPANSION AT 250'

NO.

C-9

Sunshine811
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EXHIBIT 3.5 (3)

South Dade Landfill - Cell 4/5 Vertical Expansion to 200'
Opinion of Probable Additional Construction Cost for Capping

	Area			
150 ft final elevation	**1,900,237**	sf	43.62	acres
200 ft final elevation	**1,174,309**	sf	26.96	acres
delta	**725,928**	sf	**16.67**	acres

	Item	2025	Units	Quantity	Unit Cost	Total Cost
Final Cover						
Vegetative Cover	**1**	$3.40	SY	80,659	$3.40	$273,976
18" Protective Cover Soil	**2**	$14.61	CY	40,329	$14.61	$589,145
Geocomposite Drainage Layer	**3**	$12.13	SY	80,659	$12.13	$978,076
40 mil textured HDPE Geomembrane	**4**	$5.46	SY	80,659	$5.46	$440,661
12" Intermediate Soil Layer	**5**	$34.03	CY	26,886	$34.03	$914,851
					subtotal	**$3,196,708**
Additional Cost for Cap					**5.33 % for side slopes**	**$170,385**
Down Drain System						
24" Solid corrugated HDPE Pipe	**6**	$40.81	LF	1,500	$40.81	$61,213
Terrace Catch Basins	**7**	$2,969.17	each	18	$2,969.17	$53,445
Bottom Energy Dissipater	**8**	$55,246.79	each	4	$55,246.79	$220,987
Top Drainage Inlet	**9**	$1,781.50	each	10	$1,781.50	$17,815
Terraces	**10**	$142.52	LF	5,395	$142.52	$768,897
Additional SW Cost						**$1,122,357**
Additional Roads						
Final Access Road	**11**	$498.82	LF	930	$498.82	$463,904
Top Access Road	**12**	$617.59	LF	-1,124	$617.59	-$694,169
Additional Road Cost						**-$230,265**
					Total	**$1,062,476**
					Rounded Up Total	**$1,100,000**

MDC115

South Dade Landfill - Cell 4/5 Vertical Expansion to 250'
Opinion of Probable Additional Construction Cost for Capping

	Area			
150 ft final elevation	**1,900,237**	sf	43.62	acres
250 ft final elevation	**619,602**	sf	14.22	acres
delta	**1,280,635**	sf	**29.40**	acres

	Item	2025	Units	Quantity	Unit Cost	Total Cost
Final Cover						
Vegetative Cover	**1**	$3.40	SY	142,293	$3.40	$483,331
18" Protective Cover Soil	**2**	$14.61	CY	71,146	$14.61	$1,039,331
Geocomposite Drainage Layer	**3**	$12.13	SY	142,293	$12.13	$1,725,458
40 mil textured HDPE Geomembrane	**4**	$5.46	SY	142,293	$5.46	$777,385
12" Intermediate Soil Layer	**5**	$34.03	CY	47,431	$34.03	$1,613,920
					subtotal	**$5,639,425**
Additional Cost for Cap					**5.33 % for side slopes**	**$300,581**
Down Drain System						
24" Solid corrugated HDPE Pipe	**6**	$40.81	LF	3,000	$40.81	$122,425
Terrace Catch Basins	**7**	$2,969.17	each	36	$2,969.17	$106,890
Bottom Energy Dissipater	**8**	$55,246.79	each	4	$55,246.79	$220,987
Top Drainage Inlet	**9**	$1,781.50	each	10	$1,781.50	$17,815
Terraces	**10**	$142.52	LF	9,666	$142.52	$1,377,602
Additional SW Cost						**$1,845,720**
Additional Roads						
Final Access Road	**11**	$498.82	LF	1,972	$498.82	$983,676
Top Access Road	**12**	$617.59	LF	-2,270	$617.59	-$1,401,925
Additional Road Cost						**-$418,250**
					Total	**$1,728,051**
					Rounded Up Total	**$1,800,000**

MDC116

Exhibit 3.6

FDEP Long-Term Care
Section 62-701.620 F.A.C.

62-701.620 Long-Term Care.

(1) Long-term care period. The owner or operator of any landfill which receives wastes after January 6, 1993, shall continue to monitor and maintain the integrity and effectiveness of the final cover as well as other appurtenances of the facility, control erosion, fill subsidences, comply with the water quality monitoring plan, maintain the leachate collection system, measure volumes of leachate removed, and maintain the stormwater system, in accordance with an approved closure plan for 30 years from the official date of closing. Before the expiration of the long-term care monitoring and maintenance period, the Department may extend the time period if the closure design or closure operation plan is found to be ineffective, or if the permittee has not performed all required monitoring and maintenance. For purposes of this subsection, "ineffective" means that:

(a) The water quality monitoring system indicates that the landfill continues to impact ground water or surface water at concentrations that may be expected to result in violations of Department water quality standards or criteria;

(b) The gas monitoring system indicates that the landfill continues to produce gas in amounts that may be expected to exceed the concentrations of combustible gases allowed in paragraph 62-701.530(1)(a), F.A.C.;

(c) Significant subsidence of waste has not ceased, or

(d) The final cover does not have well established vegetation or is showing signs of continuing significant erosion problems.

(2) Permit for long-term care. Long-term care shall be conducted in accordance with a closure permit. Closure permits involving only long-term care shall be issued with a duration of ten years unless the owner or operator specifically requests a shorter duration. If a shorter duration is requested, the permit fee shall be prorated.

(3) Reduced long-term care period. The owner or operator of a landfill may apply to the appropriate District Office of the Department for a permit modification to reduce the long-term care period or eliminate some aspects of long-term care.

(a) The Department will grant such modification if reasonable assurance is provided to the Department that there is no threat to human health or the environment and if the landfill:

1. Has been constructed and operated in accordance with approved standards,

2. Was closed with appropriate final cover, vegetative cover has been established, and a monitoring system has been installed,

3. Has a 10-year history after closure of no violations of water quality standards or criteria detected in the monitoring system, and no increases over background water for any monitoring parameters which may be expected to result in violations of water quality standards or criteria; and,

4. Has had no detrimental erosion of cover, and subsidence of waste has ceased.

(b) The Department will grant such modification for a portion of a landfill if reasonable assurance is provided to the Department that it was closed in accordance with the requirements of paragraph 62-701.600(8)(b), F.A.C., prior to February 15, 2015. The requirements of subsection 62-701.600(7), F.A.C., shall not apply to that portion of the landfill until the entire landfill is closed.

(4) Modified water quality monitoring plan.

(a) The owner or operator of a landfill may apply for a modification to its water quality monitoring plan to remove a parameter from the list specified in subsection 62-701.510(7), F.A.C. The Department will grant such modification upon a demonstration that ground water, and surface water if required, have consistently been sampled and analyzed for the parameter, and that the parameter has never been detected in any ground water well or surface water point during the active life of the landfill.

(b) The owner or operator may apply for a modification of its water quality monitoring plan to reduce or eliminate the frequency of monitoring. The Department will grant such a modification upon a demonstration that there have been no violations of water quality standards or criteria detected in the monitoring system after final closure, and that sufficient time has passed so that any leachate escaping the landfill since final closure would be expected to have reached the monitoring well system.

(5) Gas monitoring. The gas collection and monitoring system required in paragraph 62-701.600(4)(f), F.A.C., shall be maintained for the long-term care period of the landfill. The owner or operator of a landfill may apply for a permit modification to reduce or eliminate the frequency of monitoring. The Department will grant such a modification if the applicant demonstrates that the landfill has stabilized to the point where there is no significant production of combustible gases or objectionable odors.

(6) Stabilization report. Every five years after issuance of a permit for long-term care, the permittee shall submit a report to the Department that addresses stabilization of the landfill. The submittal shall include the technical report required in paragraph 62-701.510(8)(b), F.A.C., and shall also address subsidence, barrier layer effectiveness, storm water management, and gas production and management. For lined landfills, the submittal shall also address leachate collection and removal system effectiveness, and leachate quantity.

(7) Right of access. The landfill owner or operator shall possess or acquire a sufficient interest in, or a right to use, the property

for which a permit is issued, including the access route onto the property to carry out the requirements of this rule. The permittee shall retain the right of entry to the landfill property for the long-term care period, after termination of solid waste operations, for inspection, monitoring and maintenance of the site.

(8) Replacement of monitoring devices. If a monitoring well or other device required by the monitoring plan is destroyed or fails to operate for any reason, the landfill owner or operator shall, immediately upon discovery, notify the Department in writing. All inoperative monitoring devices shall be replaced with functioning devices within 60 days of the discovery of the malfunctioning unit unless the landfill owner or operator is notified otherwise in writing by the Department.

(9) Following completion of the long-term care period for each solid waste management unit, the owner or operator shall notify the Department that a certification, signed and sealed by a professional engineer, verifying that long-term care has been completed in accordance with the closure plan has been placed in the operating record.

Rulemaking Authority 403.704 FS. Law Implemented 403.703(5), 403.704, 403.707 FS. History–New 7-1-85, Formerly 17-7.075, 17-701.075, Amended 1-6-93, 1-2-94, 5-19-94, Formerly 17-701.620, Amended 5-27-01, 1-6-10, 8-12-12, 2-15-15.

Exhibit 3.7

Landfill Redevelopment Report (Arcadis)

EXHIBIT 3.7

ARCADIS

Miami-Dade County Department of Solid Waste Management

Landfill Redevelopment Study

Final Report

May 14, 2025

Landfill Redevelopment Study

FINAL REPORT

May 14, 2025

Prepared By:
Arcadis U.S., Inc.
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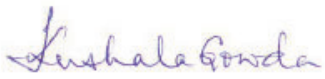
Florida 33134
Phone: 786.268.3200

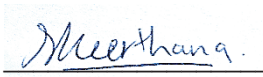
Prepared For:
Mr. John Wong
Assistant Director, Technical Services and Environmental Affairs
Miami-Dade County Dept. of Solid Waste Management
2525 NW 62nd Street, 5th Floor
Miami, FL 33147

Our Ref:
30238003

Christopher C. Tilman, PE, BCEE
Project Manager



Kushala Gowda, PE
Deputy Project Manager



Keerthana Sreenivasan
Environmental Management Consultant

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Contents

Figures

1 Introduction

1.1 Purpose

The purpose of this report is to provide the Miami-Dade County Department of Solid Waste Management (Department) with a high-level review of applicable landfill regulations and to present several examples of successful landfill redevelopment projects from Florida and around the United States. Arcadis U.S., Inc. (Arcadis) analyzed Florida regulations, including Chapter 62-701, F.A.C., covering landfill closure, long-term care, and redevelopment, as well as relevant regulations from other states. As requested by the Department, research on successful landfill redevelopment projects included three Miami-Dade County examples (Munisport Landfill (redeveloped into Sole Mia), Virginia Key Landfill (converted into a recreational park), and the Old South Dade Landfill (to be developed into a solid waste complex)) with additional case studies from other states to highlight strategies and lessons applicable to future redevelopment initiatives.

1.2 Overview of Landfill Redevelopment

Landfills are designated areas where waste is buried and managed, designed to minimize environmental and health risks. The first modern sanitary landfill in the US was built in Fresno, California in 1937, which was a simple trench landfill. Today there are over 10,000 closed Municipal Solid Waste (MSW) landfills and 3,000 active landfills in the United States,[1] with the largest landfill (by area) spanning over 2,200 acres. There are a few different types of landfills that may result in different end uses due to several factors, including landfill design, waste composition, size, engineering constraints, topography, and remediation requirements. Also, landfills can either be filled below grade or above grade. Below grade landfills typically are capped at grade and maintain the surrounding topography. Filled to grade landfills are filled vertically and may reach over 100 feet above existing grade [2], resulting in a significant change in topography.

Typical types of landfills include the following:

[1] https://esemag.com/news/closed-landfills-renewed-solar-farms-north-america/

[2] https://www.scsengineers.com/wp-content/uploads/2015/03/Law-Goudreau-Fawole-Maximizing_Landfill_Capacity_by_Vertical_Expansion.pdf

Figure 1. *A closed cell at the Apex landfill, NV*
Source: Las Vegas Sun

- Trench landfills – these landfills are typically unlined and are constructed by cutting parallel trenches in the ground, placing and compacting solid waste, then covering the waste with soil excavated from the trenches.
- Lined landfills – these are modern, RCRA Subtitle D landfills that are designed with a primary and secondary liner system and leachate controls. Lined landfills are also typically capped with a liner to encapsulate the waste mass and covered with approximately two feet of final soil cover.
- Unlined landfills – typically older landfills that lack formal engineering containment provisions and is generally later classified as a brownfield or superfund site depending on resulting environmental contamination
- Slurry Wall landfills – unlined landfills in areas underlain by a natural clay soil layer, with engineered clay slurry walls constructed around the site perimeter that tie into the natural clay layer to form a clay barrier under the landfill to contain leachate.

Limitations in use for different types of landfills:

Figure 2*. Building a new landfill.*
Source: Environmental.laws.com

- Landfill Gas – There may be additional considerations for gas producing landfills including – adequate ventilation, indoor gas monitoring (if applicable), additional liability, isolated hydraulic lines, spark proof appliances, foundation with vapor barriers. In addition, landfill gas wells at the surface of a landfill will limit some redevelopment options.
- Settlement – Landfill settlement from fill loadings, decomposition of waste, and other factors creates an inherently unstable foundation for structures.
- Leachate Control – Leachate seeps on landfills are relatively common and can result in contact exposure to humans if not properly addressed.
- Uneven Topography – The landfill surface is built for stability and drainage and typically does not have large flat areas needed for buildings, ball fields, and other end uses. Due to drainage requirements and the inherently variable effects of settlement, fill compaction, and erosion the general topography of most landfills is uneven and not well suited for some end uses.

Lined landfills have lower environmental risks but are generally not well suited for redevelopment with structures because of the additional engineering effort needed to avoid liner damage. Unlined landfills are better suited for redevelopment with structures as they have no liner systems that could be damaged, but they have a higher environmental liability due to contamination risk, where regulatory restrictions may limit development options and result in higher remediation costs. Both types, however, can be redeveloped for a variety of end uses that can benefit the community.

Old landfills can be redeveloped to provide environmental, economic and social benefits. Landfill land provides cheaper land in typically central locations as land demand increases. Landfills can be redeveloped to parks and nature reservations or renewable energy projects promoting job growth, revenue and sustainability in the local community.

Common types of landfill redevelopment projects across the United States include:

- Public Parks with recreational amenities such as soccer fields, trails, driving ranges – generally preferred by DEP due to minimal waste disturbance.
- Golf courses.
- Other solid waste processing facilities such as composting facility, landfill gas to energy, and transfer stations.
- Mixed use - including residential, retail and commercial outlets.
- Solar energy park - Denver Arapahoe Disposal Site (DADS) Solar Project (Aurora, Colorado).

Figure 3. *Liberty National Golf Course, NJ*
Source: golfpass.com

Public perception of landfill redevelopment:

- Environmental Concerns – contamination risks, impact to nearby ecosystems. Contamination migrations during construction or heavy rains.
- History as a Superfund Site – trust in thoroughness of remediation efforts.
- Opposition from Environmental Groups – prioritized profit over environmental responsibility. Exposing long term residents to health risks.
- Public Health Concerns – exposure to contaminated soils, water, landfill gases.
- Community Distrust – lack of transparency, environmental justice.
- Local Opposition to Redevelopment – traffic impact, was it the best use of the land, differential settlement/ structural integrity.

Landfill redevelopment of landfills in long term care has additional construction considerations discussed below:

- Conduct periodic surveys to ensure combustible gases do not exceed 25% of the lower explosive limit for methane inside structures. This is applicable for gas producing closed landfills and structures built on landfills that may have indoor occupancy. Gas monitoring may continue beyond the typical 30-year post closure period.
- Design structures with good ventilation and explosion-proof electrical wiring to prevent gas accumulation.
- Avoid concentrated weight loading to prevent uneven settlement of underlying wastes.
- Minimize disturbance to landfill cover or barriers, and repair any damage.
- Ensure stormwater systems are lined and obtain an Environmental Resource Permit for construction.
- Prevent damage to groundwater and gas monitoring systems during construction and provide additional monitoring infrastructure if required.

- Avoid placing utilities within 200 feet of waste boundaries unless gas barriers or ventilation systems are installed.

Common engineering activities prior to construction:

- Deep Dynamic Compaction includes dropping 6-30 ton weights from heights of 30–75 feet to compact subsurface soils and stabilize the ground. Typically done on unlined landfills and construction of structures on top of the landfill. Costs range from $65,000–$87,120 per acre in addition to mobilization costs of approximately $30,000.[3]
- Gas Mitigation Systems which include the installation of subsurface ventilation layers (perforated pipes) and impervious gas barriers (spray-applied liners or HDPE). Compliance monitoring is required with gas probes or methane sensors.
- Cost of Passive Systems: $7–$9 per square foot (spray-applied liner), $3–$4 per square foot (HDPE liner) [3].
- Cost of Active Systems: Additional $3–$4 per square foot for blowers [3].

Figure 4. *Landfill Gas collection system. Source: Climate And Clean Air Coalition*

2 Regulatory Review

2.1 Florida Landfill Regulations

The Solid Waste Disposal Act of 1965 was the beginning of solid waste management regulations. Beginning in 1976, municipal solid waste landfills were regulated under Subtitle D of the Resource Conservation and Recovery Act (RCRA), which introduced liner requirements and other important improvements to landfill design and operations. By 1991, updated standards to the RCRA Subtitle D were enforced and include requirements for landfill design, groundwater monitoring, and post closure care.

Relevant Florida regulations applicable for considering landfill redevelopment include the following:

- Florida Administrative Code (FAC) 62-701 - Solid Waste Management Facilities
- Brownfield Redevelopment Act (Chapter 376, F.S.)
- Superfund Redevelopment Program
- Miami-Dade County Code of Ordinances Chapter 11B – Dumps and Landfill Sites
- Miami-Dade County Code of Ordinances Chapter 15 – Solid waste Management

2.1.1 Closure Requirements

Section 62-701.600, FAC includes the requirements for landfill closure and are summarized below.

[3] https://www.scsengineers.com/remediation-cost-saving-approach-to-redeveloping-on-old-landfills-or-dumps

- Final Cover System - A landfill must be capped with a final cover system designed to minimize infiltration of water and prevent contamination migration and typically consists of a geomembrane liner, soil layers, and vegetation.
- Closure Plan - A detailed closure plan must be submitted to the Florida Department of Environmental Protection (FDEP) and must include details on final cover installation, leachate management, stormwater controls, and gas monitoring systems.
- Financial Assurance - The facility owner/operator must provide financial assurance demonstrating the ability to fund closure activities.
- Certification - After closure activities are completed, a professional engineer must certify that the work was performed in accordance with the approved closure plan.

2.1.2 Long-Term Care Provisions

62-701.620, FAC refers to the section for post closure care and the requirements are summarized below.

- Post-Closure Maintenance - The final cover system, stormwater controls, leachate collection system, and gas management systems must be maintained for a period of 30 years (or longer as specified by FDEP based on leachate and gas monitoring results).
- Monitoring Requirements - Groundwater and surface water monitoring must continue during the post-closure period to detect contamination. Groundwater monitoring wells and surface water are typically sampled quarterly during post-closure care. The parameters to be analyzed in the landfill monitoring plan must be approved by the FDEP.
- Landfill Gas monitoring is typically conducted quarterly to ensure compliance with air quality standards and as specified in the landfill's Gas Management Plan which is approved by FDEP.
- Inspection and Reporting - Regular inspections and annual reports detailing maintenance, monitoring, and inspections must be submitted to FDEP.
- Financial Assurance – Continued financial assurance must remain in place to fund long-term care activities for the duration of the post-closure period.

2.1.3 Redevelopment Considerations

62-701.610, FAC refers to other closure procedures including use of old landfill facilities and relocation of waste. Note, Landfills can be redeveloped prior to the end of post closure period. Considerations for redevelopment of a used/closed landfill are summarized below:

- Required FDEP Approval - Consultation with FDEP is required prior to conducting activities at any closed landfills. FDEP maintains regulatory oversight of any activities that could impact the integrity of environmental protection systems, including the cover, drainage, liners, monitoring systems, or leachate and stormwater management controls
- Restrictions on Land Use - Certain types of redevelopments (e.g., residential housing) may be restricted due to potential risks from subsurface contamination or landfill gas migration.
- Landfill Gas Controls - Redevelopment projects must account for landfill gas generation and ensure adequate ventilation or collection systems are in place for gas mitigation.

- Structural Load Considerations - Construction must avoid compromising the landfill's final cover or underlying waste layers.
- Brownfield Redevelopment Act (Chapter 376, F.S.) - If the landfill is designated as a Brownfield site, redevelopment may qualify for incentives under Florida's Brownfield Redevelopment Program. This includes financial incentives, liability protections, and regulatory flexibility for remediation activities.

2.1.3.1 Waste Disturbance Options

The revised guidance for disturbance and use of old closed landfills of waste disposal areas in Florida was published in 2019 by FDEP and the key takeaways are summarized below.

2.1.3.1.1 Waste relocation on-site

Rule 62-701.610 Other Closure Procedures outlines the requirements for relocation of waste. Waste must be relocated within the original footprint of the landfill, covered with two feet of soil, compacted, and revegetated as per the closure plan. A relocation plan including site maps, waste volume estimates, excavation methods, and odor control measures must be approved by FDEP. Leachate, stormwater runoff and gas generated during relocation activities must be controlled onsite. If the landfill already has a valid closure permit, a modification of the permit is sufficient to relocate waste on site.

2.1.3.1.2 Waste Left In-Place

Waste left undisturbed is subject to closure requirements at time of operation. Additional repairs to the soil cover may be necessary if waste is not already stabilized. If groundwater contamination is detected, it may necessitate additional water quality monitoring and corrective actions.

2.1.3.1.3 Waste removal and off-site disposal

An excavation and disposal plan must be submitted for review and approval, including waste removal activities, waste characterization, handling hazardous waste, and controlling odors and leachate. Excavated uncontaminated concrete from the disposal site can be utilized as raw material or fill material without requiring a permit. However, disposal off-site could be expensive with disposal fees alone could exceed $400,000 per acre.

2.2 Selected Regulations from Other States

States and local government may have additional and often more stringent policies on redevelopment of landfills. Selected regulations relevant to the redevelopment of landfills are summarized below:

- California:
  - Requires compliance with the California Environmental Quality Act (CEQA) and includes a comprehensive environmental impact assessment.
  - Capped landfills require monitoring of subsurface stability.
  - Landfill cap design is specified in the Title 27 code requiring specific materials, thicknesses.

- New York:
  - Has a specific Policy “DMM-4 Photovoltaic Solar Projects At Closed Solid Waste Landfills” which includes addition considerations for wind and snow loading, requiring design for 25-year rain events, restricting equipment loads during construction to not exceed 10 psi [4].
  - Brownfield Cleanup Program ECL Article 27, Title 13, and implemented through 6 NYCRR Part 375 that contains different levels of clean up standards based on end use.
- Texas:
  - Redevelopment must align with local zoning and land use plans.
  - TAC Title 30 outlines further soil permeability and stability studies required during the landfill redevelopment plan.

Some states may provide incentives for certain land uses. For example, New York, New Jersey, Virginia, Massachusetts are among a few states that have state policies supporting renewable energy development on landfills[5].

3 Successful Redevelopment Projects

3.1 Munisport Landfill – City of North Miami, FL - Redevelopment to Sole Mia

Figure 5. *Rendering of Solé Mia. Credit: Turnberry, Lefrak.*

The Munisport Landfill was an unlined landfill that initially closed in 1981 and was designated as a superfund site due to contamination concerns. EPA removed the site from the National Priorities List (NPL) in 1999 after successful remediation efforts including the installation of a barrier to collect and treat groundwater and prevent contaminants from spreading as well as tidal wetland restoration activities.

The landfill is being redeveloped to Solē Mia Miami, a mixed use community which includes parkland, a lagoon and beaches, a million square feet of office and retail space, medical center, a hotel, and more than 4,000 residential units. Construction began in 2015 and will occur in multiple phases over 15 years. A methane gas abatement system was approved and installed in phases. The next phases includes construction of a Porsche dealership, indoor sports arena and condominiums.

[4] https://dec.ny.gov/regulatory/guidance-and-policy-documents/policy-dmm-4-guidance-for-photovoltaic-solar-projects-at-closed-solid-waste-landfills
[5] https://www.epa.gov/system/files/documents/2022-06/epa-re-powering_examples_of_state_policies%20508.pdf

The redevelopment of the Munisport Landfill into Sole Mia cost an estimated total cost of $4 billion. The high cost includes environmental mitigation efforts. However, Sole Mia is a source of revenue for the City of North Miami and the County through lease rates and property tax values that increase after development. As of December 2017, the site supported 37 on-site businesses, over 100 employees and generated an estimated $6.4 million in annual sales revenue[6]. MIA hotel within Sole Mia brought in gross revenues of $15.7 million in fiscal year 2023.[7]

Figure 6. *Buildings at the Lagoon at Sole Mia. Credit: Sole Mia Rentals*

3.2 Virginia Key Landfill, City of Miami, FL - Recreational Park Development

Figure 7. *Virginia Key Closed Landfill. Source: Miami Herald*

The Virginia Key Landfill consists of approximately a 124-acre parcel that was owned and operated by City of Miami as an unlined municipal dump from 1961 to 1978. The disposal of municipal solid waste and sludge has impacted the groundwater in the vicinity of the landfill. In 2013, Miami-Dade County assigned $45 million for the complete remediation and closure of the landfill[8].

Planned remediation activities include a cap consisting of two feet of clean fill cover and revegetation designed to be impermeable and contoured so that rainwater runs off into clean ground around the site's perimeter. A stormwater management and groundwater remediation system will also be implemented by 2028 before redevelopment of the park may begin. The proposed park improvements include a recreation center building, sports fields, restored mangroves, multi-use nature trails, picnic areas and a parking lot.

[6] https://semspub.epa.gov/work/HQ/100002077.pdf

[7] https://www.miamidade.gov/Apps/ISD/StratProc/ProcurementNAS/pdf_Files/FutureSolicitations/Future_Competitive_Posting_Hotel_MIA.pdf

[8] http://archive.miamigov.com/planning/docs/plans/vk/4_virginia_key_final_report.pdf

3.3 Old South Dade Landfill, Homestead, FL - Solid Waste Complex Development

The Old South Dade Landfill, comprised of 550 acres, was an unlined landfill closed for operations in 1987. A "No Further Action with Conditions" was completed, and a Conditional Site Rehabilitation Order was issued for the site in 2022. The landfill redevelopment will include building a 3,000 tons per day (tpd) transfer station complex, which includes a new People and Internal Operations Department (PIOD) office, a household hazardous waste collection center, and a parking facility. The project is in the design stages and is expected to be in operation by 2028. In 2014, a 47-acre parcel of the total 550 acres was acquired by the Parks, Recreation and Open Space Department to allow for the development of a Miami-Dade regional soccer park.

3.4 58th Street Landfill, Hialeah, FL – Mixed Use

Figure 8. *Google Earth image of the 58th Street Landfill*

The 660-acre Northwest 58th Street Landfill was classified as a Superfund site in 1983 due to contaminated groundwater. The landfill was operational from 1952 to 1982 in Miami-Dade County and accepted municipal and industrial waste. Remediation activities included construction of a leachate collection system and interceptor trench, installing controls for landfill gas migration and odor, increased routine maintenance and inspections, and closure as per EPA guidance. The site was taken off the EPA NPL list in 1996.[9] The current permit for the site is nearing the end of long-term care period in December 2025.

Miami-Dade County currently uses a portion of the closed landfill as a staging area for hurricane debris when needed. The southern portion of the site has been developed and put into reuse with a variety of municipal uses, including the Mosquito Control Division, Public Works, Fire and Public Safety Training Facilities, and South Florida Water Management District offices, are located on site. The northern portion of the site is currently under consideration for potential redevelopment options.

[9] https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.redevelop&id=0400900

3.5 Combe Fill North Landfill, Mount Olive Township, NJ - Solar Park

In recent years, solar developments on closed landfills have increased by 80 percent nationwide, due to their ability to help counties and companies achieve greenhouse gas (GHG) reduction goals, provide sustainable renewable revenue streams, create local jobs, and reduce reliance on farmland as electrical demand rises. The former Combe Fill North Landfill Superfund site was transformed into the Mount Olive Solar Field under a public-private partnership between CEP Renewables and Mount Olive Township in New Jersey. The landfill, operated from 1966 to 1978, accepted domestic and industrial waste, including sewage sludge, before being designated as a Superfund site by the EPA in 1983. Cleanup efforts, led by the EPA and the New Jersey Department of Environmental Protection, were completed in 1991. Design included landfill settlement analyses, site access plans and plans to preserve the landfill cap. Construction of the solar park was completed in 2023 and occupies 65 acres, generates 25.6 megawatts of clean energy, and provides significant revenue opportunities for the township, including $2.3 million from a tax lien and an estimated $50,000 in annual tax revenue[10].

***Figure 9**. Aerial view of Mount Olive Solar Park. Credit: New Jersey Business Magazine*

3.6 Shoreline Mountain View Landfill, San Francisco, CA - Amphitheater

***Figure 10.** Aerial view of the amphitheatre.Source: https://www.mountainviewamphitheater.com/shoreline-amphitheatre/*

The Mountain View Landfill, officially known as the Vista Landfill, was a Class III solid waste site that ceased operations in 1984 and later became the foundation for the Shoreline Amphitheatre and surrounding park. The city transformed the 750-acre site into a multi-use recreational area featuring a golf course, lake, nature trails, and an amphitheater. The amphitheater opened in 1986, after which, methane seepage caused a series of fires during concerts, including one where a cigarette ignited flammable gas escaping through the lawn[11]. Several people sustained minor burns during these incidents, drawing public attention to the safety risks of constructing on a landfill. The city initiated extensive mitigation efforts, including daily methane monitoring, installation of a gas barrier, and a full lawn renovation to include methane removal systems. The landfill was sealed with a four-foot-thick clay and soil cap and fitted with 264 vertical wells and 7 horizontal collectors to extract gas[12]. Collected landfill gas is managed through on-site flares, microturbines, off-site engines, and a portion is routed to a nearby corporation for

[10] https://www.dailyrecord.com/story/news/local/land-environment/2023/02/17/mount-olive-nj-superfund-turned-solar-farm-connected-to-grid-by-jcpl/69909795007/

[11] https://www.mountainview.gov/our-city/departments/community-services/shoreline-at-mountain-view/landfill

[12] https://www.sfgate.com/sf-culture/article/shoreline-amphitheatre-history-open-concerts-15594391.php

combustion. The landfill has a leachate collection system to ensure safe disposal through the sanitary sewer. Additionally, a methane recovery system established in 1978 captured approximately 600,000 cubic feet of gas daily, which was sold to PG&E Corporation, generating revenue for park maintenance. These engineering measures have successfully mitigated environmental hazards, and no further methane incidents have been reported since the late 1980s.

3.7 Bayonne Sanitary Landfill, Bayonne, NJ – Golf Course

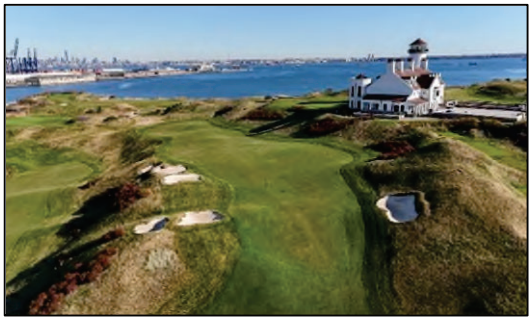

Figure 11. *Aerial view of the Bayonne Golf Club. Credit: Richard Metelski, Google Images*

The Bayonne Sanitary Landfill in Bayonne, New Jersey, was once a municipal solid waste disposal site that lacked proper containment measures and became a site for illegal dumping, including abandoned vehicles. Over time, it presented significant environmental challenges such as leachate seepage into surrounding areas and the emission of methane gas, posing risks to nearby communities and ecosystems. In response, comprehensive remediation efforts were undertaken to stabilize and repurpose the 150-acre waterfront site. These included the installation of a perimeter vertical hydraulic barrier system composed of a slurry wall and sheet pile wall to prevent leachate migrations, a leachate collection and treatment system and a two-foot landfill cap with a membrane and clean fill[13]. Although specific methane management systems were not detailed, such projects typically include gas collection systems to capture and treat emissions. The remediation process also impacted nearly 10 acres of wetlands, which were offset by the creation of a 13.9-acre intertidal habitat that now supports biodiversity and public access[14]. By the early 2000s, the transformation was complete, and the landfill had been successfully converted into the Bayonne Golf Club. The project was entirely privately funded, with no public money used for cleanup or construction.

3.8 San Jose Class III Landfill, Santa Clara, CA - BMX Track

Figure 12. *Santa Clara BMX Track. Credit: Hwong, Google Images*

This site is a closed Class III municipal waste disposal site which began accepting municipal waste in 1961 through 1993, and received final closure in September 1994. The landfill has an existing landfill gas collection and control system that leads to a landfill gas-to-energy facility operated by Ameresco Inc. under contract with the City. The gas collection system burned approximately 60,950,000 standard cubic feet of landfill gas between June 2015 and May 2016. Some parcels of the landfill remain unlined while the newer parcels have clay base liners. VOCs were found to be in the groundwater, hence contingency procedure into drilling or excavations must be in place for redevelopment plans.

[13] https://www.cmeusa1.com/solidWasteConsulting/detail.php?Bayonne-Landfill-Capping-5=&utm_source=chatgpt.com

[14] https://www.mgmclaren.com/projects/bayonne-golf-landfill-redevelopment/?utm_source=chatgpt.com

Most of the Landfill has been used as a golf course and BMX track since 1994. However, the golf course and BMX track will be replaced by a $6.7 billion mixed-use complex with up to 1,680 units of housing, 5.7 million square feet of offices, 1.1 million square feet of retail space and 700 hotel rooms on 240 acres. The new post-closure land use plan was approved in 2016, and construction activities began in 2022. To mitigate risks, the development calls for a 1-foot-thick concrete barrier and a 1-foot thick clay liner on top covering more than 30 central acres of landfill where housing would be built. The entire inter-connected platform for the project's center will be anchored by hundreds of piers driven up to 150 feet into the ground and have slip casings to accommodate settlement of waste. If protective liners are being penetrated, test pile studies to monitor leachate migration must be conducted. Other measures to protect the area include sensor and alarm systems, for groundwater, methane, and leachate migration.

3.9 Alpha Ridge Landfill, Marriottsville, MD - Composting Facility

The Alpha Ridge Landfill is a 500-acre site with 190 acres dedicated to landfilling. The Composting Facility is permitted for 15 acres at the Alpha Ridge Landfill and is designed to compost yard trim, food scraps and manure in aerated, covered piles[15]. The original pilot facility started accepting material in March 2013 with just 2 acres and has been expanding since. Composting occurs in 10 bunkers, each measuring 26 feet wide by 80 feet long, with 10-foot high bunker walls, and holding approximately 700 cubic yards of material. At full capacity, the tipping fee and airspace cost savings, combined with the revenue from compost sales, is expected to create approximately $1 million in revenue annually[16]. The design utilized trench drains integrated into the bunker floors to facilitate collection and reuse of contact water and incorporates a negative aeration design to manage moisture and odor.

Figure 13. *(Left) Construction of the alpha ridge composting facility. Credit: DFI Engineering. (Right) Completed Composting bunkers at alpha ridge. Credit: Howard County*

[15] https://eaest.com/insight/municipal-composting-facility-proves-economics-and-feasibility-of-large-scale-processing/

[16] https://www.howardcountymd.gov/bureau-environmental-services/alpha-ridge-landfill/composting-facility

3.10 American Environmental Landfill, Sand Springs, OK - Bee Farm

Figure 14. *Bee Farm at American Environmental Landfill, OK*

The American Environmental Landfill (AEL) in Sand Springs, Oklahoma, spans over a total of 400 acres but only 290 acres of both closed and current landfill space generates landfill gas. With a planned $35 million investment in 2025, the facility is set to enhance its infrastructure, including a new gas plant expected to produce 2,000 dekatherms of gas generation capacity[17]. Currently, the landfill utilizes its gas collection system to generate 3.2 megawatts of electricity, underscoring its commitment to sustainable waste management and renewable energy production. The landfill is still in operation and has closed landfill cells over which a bee farm was first developed in 2015, with 280,000 bees and was reported to have over 1 million bees in 2019 that produce two types of "landfill honey"[18]. Flower gardens containing milkweed and wildflowers are planted on the rest of the closed landfill space, to attract monarch butterflies and support the growing bee population. Additional permitting may be required to develop a bee farm including beekeeping registration, health and safety permits, hive construction permits, and public nuisance compliance. However, there may be incentive programs such as the pollinator protection program.

4 Conclusions

As mentioned previously, today there are over 10,000 closed MSW landfills in the United States. Landfill redevelopment is a growing trend across the country, as it provides low-cost land for revenue creating projects, opportunities for remediation of contamination, and environmental benefit to the local community. There are many possible end-uses for redeveloped landfills, the most common being parks, open recreational spaces such as tennis courts, golf courses that have lower construction restrictions. Examples include the Bayonne Golf Club in New Jersey and the Virginia Key Landfill in Florida. Landfills can also be repurposed for more structurally demanding projects, such as multi-use complexes that include residential housing and commercial outlets such as Sole Mia in Miami or the Amphitheater in California. Landfills can also be transformed into renewable energy projects, such as solar farms, landfill gas-to-energy, and composting facilities which help counties and municipalities achieve their sustainability goals while generating employment opportunities and revenue.

[17] https://www.newson6.com/story/67f734ebe229382dfa0a89e5/renewable-energy-company-to-build-natural-gas-plant-at-sand-springs-landfill

[18] https://www.nwahomepage.com/news/landfill-honey-bees-are-creating-a-buzz-thanks-to-one-tulsa-trash-man-2/

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ATTACHMENT 4

Directive 250195: Report on the Feasibility of Expanding Cardboard Recycling at Trash and Recycling Centers and Establishing a Seasonal Cardboard Disposal Program

Memorandum

MIAMI-DADE COUNTY

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on the Feasibility of Expanding Cardboard Recycling at Trash and Recycling Centers and Establishing Seasonal Cardboard Disposal Program - Directive No. 250195

Executive Summary

This report is provided pursuant to Resolution No. R-191-25 ("Resolution"), sponsored by Commissioner Raquel Regalado and adopted by the Board of County Commissioners ("Board") on February 19, 2025. The Resolution directed the Mayor or Mayor's designee to prepare a report evaluating the feasibility of expanding cardboard recycling at all 13 Trash and Recycling Centers ("TRCs") and of establishing a seasonal cardboard disposal program that is identified on the County's website and social media outlets.

This report provides an overview of cardboard recycling and details which TRCs have cardboard recycling and the space limitations that prevent all TRCs from providing access to cardboard recycling. The report also outlines the staffing and contamination challenges of providing expanded seasonal cardboard recycling drop-off at community locations that are not staffed. To address these challenges and space limitations, the Department of Solid Waste Management ("DSWM") will expand cardboard recycling drop-off locations during the holiday season to its two home chemical collection centers and will further determine how cardboard recycling can be deployed at the remaining six TRCs. The report also highlights that DSWM's website has been updated to include which TRCs currently have cardboard recycling drop-off services and that the Zero Waste Master Plan ("ZWMP") consultant will include expanded cardboard recycling drop-off as part of the Plan.

The Department will actively explore a range of revenue-generating opportunities to support long-term financial sustainability. Upon completion of the analysis, a supplemental item will be presented detailing the findings, potential funding sources, and recommendations for implementation.

Background

Old Corrugated Cardboard ("OCC") is a valuable recyclable material commonly accepted in recycling programs across the U.S. In April 2025, OCC was the second highest revenue-generating material for Miami-Dade County's ("County") curbside recycling program, second only to High-Density Polyethylene ("HDPE") Plastics. Despite these favorable recycling markets, OCC and paper are still landfilled at fairly high rates across the country. According to a national study conducted by the National Renewable Energy Laboratory ("NREL"), 56% of paper and cardboard waste was landfilled, six percent (6%) was combusted, and 38% was recycled[1]. In 2019, $4 billion worth of paper and cardboard waste was landfilled. To assist in capturing materials for beneficial use, DSWM provides its customers access to 13 TRCs across the county. TRCs can be used to drop off certain waste materials, including cardboard.

[1] Milbrandt et al., "Paper and cardboard waste in the United States: Geographic, market, and energy assessment - ScienceDirect" *Waste Management Bulletin* Volume 2, Issue 1 (2024)

DSWM customers can drop off cardboard at seven TRCs. DSWM is interested in providing these drop-off services at all TRCs, but the limiting factor has been space— not every TRC has sufficient space for a dumpster to be serviced.
Recycling generation fluctuates throughout the year and may fluctuate for a variety of reasons, but seasonal holidays may contribute to elevated recycling figures. For the County, the recycling figures for December 2024 (4,917 tons) were the third-highest figures in calendar year 2024, behind October 2024 (5,117 tons) and January 2024 (5,468 tons). Given the elevated recycling figures around the holiday season, an investigation on how to maximize OCC from disposal is warranted as expansion of services or collection points may allow for greater cardboard recycling across the County.

OCC has been considered a reliably recyclable material for decades, given the versatility of end markets and reduced likelihood of contamination (compared to that of the plastics recycling market). Despite this, cardboard and paper are still frequently landfilled. According to NREL, 56% of paper and cardboard waste was landfilled, 6% was combusted, and 38% was recycled in 2019. Additionally, it is estimated by NREL that 26% of total municipal solid waste (“MSW”) managed nationwide was paper and cardboard waste. In Florida, it was estimated that cardboard constituted nearly 30% of total MSW managed at disposal facilities. Although Florida is slightly above the national average, the County is significantly lower; a recent waste composition study conducted at DSWM facilities found that 19.9% of residential MSW waste from DSWM customers was cardboard (8.7%) and paper (11.2%). These findings illustrate that although there is still cardboard and paper that needs to be recycled, residents are recycling cardboard and paper waste above state and national trends.

The Miami-Dade County DSWM has provided cardboard recycling services as part of its curbside recycling program since the inception of the program around 1990. Cardboard and paper have consistently been one of the most recycled commodities in the recycling program. From the first quarter of CY 2022 to the fourth quarter of CY 2023, cardboard/paper has accounted for nearly 60% of all materials recycled as part of the curbside recycling program (Figure 1). In addition to the curbside recycling program, DSWM also provides DSWM customers with the opportunity to drop cardboard recycling off at seven TRCs. This service is to help residents recycle larger cardboard boxes that otherwise wouldn’t fit in the 65-gallon recycling bin.

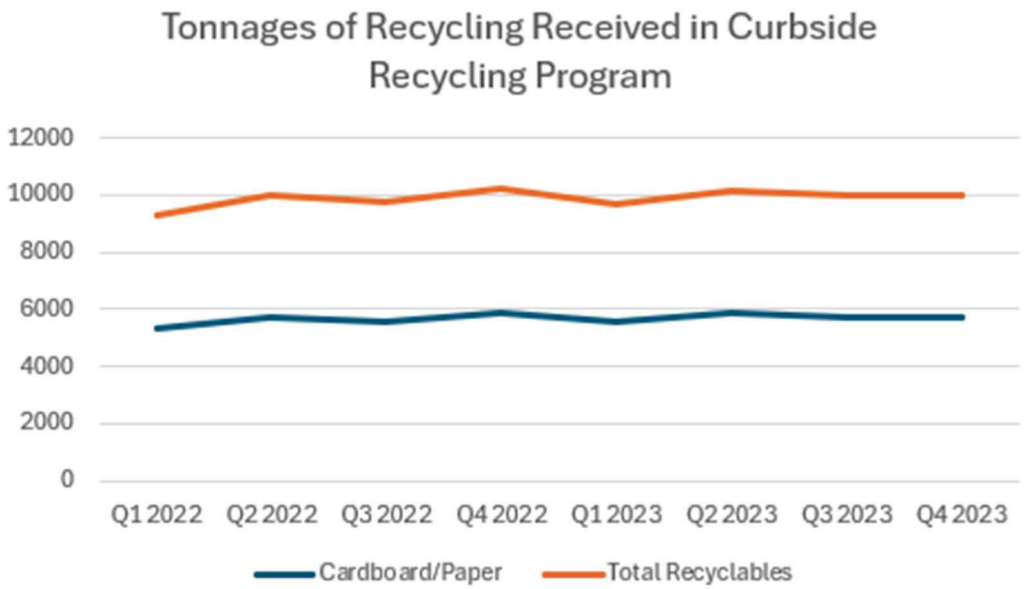

Figure 1: Tonnages of Recycled Materials from Curbside Recycling Program

Similar to the County's residential recycling program, cardboard recycling from our TRCs is contracted out to a commercial hauler, Waste Management ("WM"). The dumpsters that are serviced by WM are six cubic yard containers and are serviced at least weekly. WM charges $16.70 per TRC per week to service these cardboard recycling containers. Residents can access these cardboard recycling containers during regular TRC operating hours, 7:00 AM – 5:30 PM, seven days a week.

Expanding Cardboard Recycling Services:

DSWM provides cardboard recycling services for DSWM customers at seven of its TRCs. DSWM has previously evaluated whether the remaining six TRCs could receive the same cardboard recycling services as the seven TRCs and determined that it was not feasible to provide the same level of cardboard recycling services due to space constraints. This is largely attributed to the size of the TRCs; there is insufficient room to place a dumpster and have it serviced. Accordingly, only seven TRCs currently have cardboard recycling infrastructure.

To expand cardboard recycling to the smaller TRCs that lack cardboard dumpsters, DSWM could provide recycling carts at the six TRCs where a recycling truck does not have sufficient space to service dumpsters. This approach could help increase the cardboard recycling rate in the County but would require collection logistics and costs

According to the EPA, it is estimated that Americans produce 25% more waste during the month of December than any other month in the year[2]. Although Miami-Dade County doesn't experience as high of a variation in waste generation as the EPA references, December is one of the busiest months for both garbage and recycling collection services. In Calendar Year ("CY") 2024, 52,741 tons of garbage were collected in December; this was eight percent (8%) higher than the CY average of 48,858 tons/month and was the busiest month of the year. That same CY, recycling figures were the third

[2] Liz Ferry, "Waste Reduction Holiday Tips From the U.S. EPA", EPA, December 2, 2004.

highest in December (4,917 tons), behind October 2024 (5,117 tons) and January 2024 (5,468 tons). Expanding cardboard recycling services during the holiday season may positively contribute to greater recycling tonnages and fewer disposal tonnages.

Expansion of cardboard recycling may be implemented at other facilities other than TRCs such as other County facilities, such as libraries. To ensure that drop-off facilities are as efficient and as limited in contamination as DSWM TRCs, it is recommended that measures are taken to prevent improper use of these drop-off containers at other facilities. This would require staffing each facility with staff to monitor the cardboard recycling container, similar to what is done at the TRCs to prevent improper disposal of non-recyclable materials, thereby contaminating the cardboard waste stream. Additionally, monitoring to ensure that customers using the program are DSWM paying customers.

Alternatively, “smart” containers could be deployed at non-DSWM facilities that would allow “approved users” to utilize the containers. Such “smart” containers use a software to allow users access to the container— once provided with access, users could deposit their cardboard in the container. Under such a structure, users would be required to register an account with the company’s software and would be required to provide their address upon account registration. Once registered, their address would confirm whether they were a DSWM customer and, therefore, eligible to receive DSWM waste services. Although a self-service container prevents the need for an attendant, it does not prevent individuals from bringing their cardboard to the non-DSWM facility only to learn that they are ineligible to receive services. Such individuals may illegally dump their cardboard outside of the self-service container upon learning that they were unable to use the container. A robust outreach and education campaign would be required to mitigate this issue.

Financial Costs

DSWM currently pays $16.70 for WM to service a six cubic yard container per TRC per week. It would cost $4.05 per week to add 1 96-gallon cart to the six TRCs that do not currently have cardboard recycling receptacles.

Expanding cardboard recycling services during the holiday season has varying financial costs. If DSWM were to just add an additional six cubic yard container at both of its two Home Chemical Collection Centers (“HCCC”) during the holiday season, it would cost $16.70 per location per week. These areas are already staffed, so there likely wouldn’t be any additional labor-related financial costs. Expanding cardboard recycling services to non-DSWM facilities would have the same equipment costs as they would at the HCCC, but there would be an additional unknown labor cost. If DSWM were to provide a “smart” container that allowed DSWM customers to self-service their cardboard recycling at non-DSWM facilities, there would be a financial cost to procure the container and maintain the software. Based on market research conducted by DSWM, it would cost approximately ten thousand dollars to procure one “smart” container, not including delivery and installation fees. Container service would remain the same cost at $16.70 per container per week.

Conclusion

The County has set a goal of maximizing waste diversion and recovering as much recyclable materials as possible. Accordingly, increasing the services that are provided at DSWM TRCs aligns with these waste diversion goals and would be a crucial step towards capturing more cardboard from DSWM’s

waste stream. DSWM will evaluate how to increase cardboard recovery at the seven TRCs with existing cardboard recycling drop-offs and will determine what sized containers could be deployed at the remaining six TRCs. Additionally, DSWM will deploy six cubic yard containers at its HCCCs during the holiday season (December 10th through January 11th) to ensure residents have additional resources to recycle more cardboard. DSWM will also further evaluate technologies that would allow for residents to recycle their cardboard at non-DSWM facilities while minimizing contamination and ensuring that the service is for DSWM paying customers only. As DSWM evaluates these technologies, it has already updated its website to reflect which TRCs allow for cardboard recycling and will update it accordingly during the holiday season. DSWM has also notified the consultant working on the Zero Waste Master Plan that cardboard recycling at County TRCs, in addition to expanded recycling efforts, should be included in the Zero Waste Master Plan.

In accordance with Ordinance No. 14-65, this report will be placed on the next available Board meeting agenda, without committee review. If additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

c: Geri Bonzon-Keenan, County Attorney
Gerald Sanchez, First Assistant County Attorney
Jess McCarty, Executive Assistant County Attorney
Office of the Mayor Senior Staff
Aneisha Daniel, PhD, Director, Department of Solid Waste Management
Yinka Majekodunmi, Commission Auditor
Basia Pruna, Director, Clerk of the Board
Eugene Love, Agenda Coordinator
Office of Policy and Budgetary Affairs

ATTACHMENT 5

Directive 250208: Report on Evaluating Legally Viable Options for the Purchase of Suitable Sized Land Outside of Miami-Dade County

Memorandum

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on Out-of-County Landfill Options - Directive No. 250208

Executive Summary

On February 19, 2025, the Board of County Commissioners ("Board") approved Resolution No. R-192-25, sponsored by Commissioner Raquel Regalado, directing the County Mayor or County Mayor's designee to evaluate legally available and viable options for the County to purchase a suitably sized and situated property outside of Miami-Dade County ("County") with direct access to rail for the disposal of solid waste, either through landfilling and/ or composting. The item further directs the administration to provide a written report which shall include, but not be limited to, information as to any and all viable properties outside of Miami-Dade County, including the property description, land use designations, local governments with jurisdiction over the property, the sales price for the property, if the property is listed for sale, any legal obstacles that may interfere with the intended use, the proximity of the property to rail that can be used to transport solid waste from Miami-Dade County to the property, whether the property is located at or near the Florida East Coast Railway ("FECR") corridor and/or any rail corridor owned or operated by FECR and/or Grupo Mexico, and if so, whether FECR has executed the necessary agreements, including an easement, for the Northeast Corridor commuter rail service which is intended to operate along the FECR corridor, and any other information relevant to the decision.

A supplement to this item, as requested by Commissioner Danielle Cohen Higgins, includes a fiscal impact analysis which compares the county's current landfill service expenditures against the total projected costs of acquiring and developing new landfill facilities.

Arcadis was engaged to determine initial criteria, assumptions, opportunities, and challenges as well as provide planning-level cost estimates (Exhibit 5.1). The primary search criteria pertaining to this report is twofold:

1. 1,000 acres plot size
2. Within 25 miles of a rail line

Many other criteria can be evaluated, but for the purpose of the initial search, those are the two filters that are applied. The County's People and Internal Operations Department (PIOD) Real Estate Division was asked to conduct a search for available land of over 1000 acres in a single continuous location within 25 miles of rail service.

Background

The County owns and operates three landfills to serve the waste disposal needs within the County. The North Dade Landfill (NDL) is permitted to accept Class III waste types, which include yard waste, construction and demolition debris, processed tire chips, asbestos, carpet, cardboard, paper, glass, plastic, furniture other than appliances, or other materials approved by the Department of Solid Waste Management ("DSWM") that are not expected to produce leachate. The South Dade Landfill (SDL) is permitted to accept Class I waste types, which include non-hazardous solid waste and that is not

prohibited from disposal in a lined landfill under rule 62-701.300, F.A.C. The Resources Recovery Facility (RRF) Ashfill is permitted as part of the Power Plant Siting Act and is approved to accept ash residuals generated from the co-located waste-to-energy plant.

The Landfill Capacity Analysis Report prepared by Arcadis, our Bond Engineer, shows below the remaining landfill capacities as of October 1, 2024.

	Projected Annual Tons	**Projected Life (Years)**	**Projected Year**
North Dade Landfill (Class III)	170,000	5	2029
South Dade Landfill (Class I)	750,000	4	2028
RRF Ashfill	TBD	TBD	TBD

Due to the limited amount of available capacity, future disposal options will have to be considered.

Findings

Arcadis was engaged to determine initial criteria, assumptions, opportunities and challenges as well as provide planning level cost estimates (Exhibit 5.1). The primary search criteria pertaining to this report are twofold:

1. 1,000 acres plot size
2. Within 25 miles of a rail line

In order to consider viable options for a landfill, there are numerous criteria that will have to be considered, but for the purpose of the initial search, those were the two only criteria that were considered.

Miami-Dade County's PIOD Real Estate Division found 16 properties over 1,000 acres for sale in Florida (Exhibit 5.2). The search results were then compiled into a spreadsheet summarizing the findings (Exhibit 5.3). Based on our initial review, only five of the properties are within 25 miles of a rail station.

Items addressed in the attachments include the following information, as requested:

1. **Viable Properties**: The initial criteria search revealed 16 properties in Florida over 1,000 acres, of which only five of these are within 25 miles of a rail line.

2. **Property Description**: Property descriptions, to the extent that they are available, are included in the Infrastructure and Terrain columns on the attached spreadsheet.

3. **Land Use Designations**: included in the zoning column.

4. **Local Governments**: identified in the location columns.

5. **Sale Price**: price column (if available).

6. **Legal Obstacles**: Unknown at this time but will likely include land use issues typically associated with landfill permitting, construction, and operation.

7. **Proximity to Rail, FECR**: identified in the Proximity to Railway column.

8. **FECR Executed Agreements, including NECR easements**: This item may not be applicable unless additional rail agreements are entered into by the County.

The properties that were identified have been included in the table below:

Site No.	City	County	Acreage	Price	Zoning	Proximity to Railway
1	Indiantown	Martin	1,512.00	Not Disclosed	AG20	FEC 24.8m
2	Port St. Lucie	St. Lucie	1,186.93	Not Disclosed	Commercial	FEC 17.2m
3	Fort Pierce	St. Lucie	14,000.00	$255,000	Commercial	FEC 4.2m
4	Okeechobee	Okeechobee	2,278.00	Not Disclosed	Agricultural	FEC 46.3m
5	Alva	Lee	1,900.00	$4,000,000 - $11,200,000	Agricultural	FEC 129m
6	Saint Cloud	Osceola	5,060.00	Not Disclosed	AC	FEC 81.8m
7	Orlando	Orange	1,100.00	Not Disclosed	PD, A-2	FEC 21.8M; CSX 27.2m (West)
8	Osteen	Volusia	1,170.00	$23,400,000	Agricultural	FEC 132m: CSX 15.1m (West)
9	Bunnell	Flagler	3,812.00	$4,575,000	AC	FEC 42.7M
10	Tavares	Lake	1,389.00	Not Disclosed	N/A	FEC 137m
11	Groveland	Lake	2,474.00	Not Disclosed	PUD	FEC 140m; CSX 28.1m (North)
12	Hawthorne	Alachua	1,068.00	Not Disclosed	MU	CSX 61.6m (South); FEC 80.5m (NE)
13	Reddick	Marion	1,658.00	$27,500,000	A-1	CSX 43.1m (South)
14	Kissimmee	Osceola	1,720.00	Not Disclosed	OAC	FEC 106 m (SE); CSX 40.4m (SW)
15	Cantonment	Escambia	1,500.00	Not Disclosed	COM, HDR, MD	FEC 371m
16	Dade City	Pasco	1,066.00	Not Disclosed	AC	CSX 21.0m

AG20: Agriculture with One Residential Unit Minimum - 20 Acres; AC: AG Development and Conservation; PD: Planned Development Units; A-2: Multi Unit Residential; PUD: Planned Unit Development; MU: Multi Use; A-1: AG with Low Density Residential; OAC: Open Space; Agricultural and Water Body Conservation District; COM: Commercial; HDR: High Density Residential; MD: Medium Density

A comparison of the current landfilling costs, landfilling costs at only third party landfills, and landfilling costs at a new out of county landfill are provided below:

	Cost per Ton	Capital	Regulatory Timeline
Current Landfill Costs with Optimization	$78.50	$78.50M - $131.9M	>= 5 years
3rd Party Disposal Only (MDC Landfills closed)	$97.79	$50M	>= 5 years
Out of County New Landfill with Rail	$147.67	$2.51B - $2.73B	>= 10 years

The current landfill cost per ton of $78.50 is the average rate utilizing Miami-Dade County landfills and third party disposal contract rates. Using only third party landfills for disposal, the average disposal rate will be $97.70 per ton. Lastly, the operating costs of a new out of county landfill inclusive of rail is estimated to be $147.67 per ton in 2034 dollars. The rail cost is based on a travel distance of 110 miles; if the new landfill development site is further than 110 miles, then the rail cost will increase due to the longer travel distance.

Permitting a new landfill in Florida is extremely difficult and time consuming. It is expected to take about ten (10) years to permit a landfill; upon closure, the landfill will have to be maintained for a minimum of 30 years. The last landfill permitted in the State of Florida was the Heart of Florida Landfill located in Sumter County in January 2011. There are also no landfills in the state that are owned by a County that is located in another County.

Conclusion

A survey of available real estate was conducted to determine the viability of purchasing land outside Miami-Dade County to permit, construct, and operate a County-owned landfill outside of the County. Five properties were found to meet the minimum criteria for consideration. Significantly more effort will be needed to thoroughly evaluate these properties and determine whether any of them are truly viable options for Miami-Dade County to purchase, permit, construct, and operate a landfill. Moreover, any legal or other obstacles cannot be fully evaluated at this time without committing significant resources, including more time, labor, and funding. Permitting a new landfill in Florida is extremely difficult and time consuming. There are also no landfills in the state that are owned by a County that is located in another County.

Per Ordinance No. 14-65, this memorandum will be placed on the next available Board meeting agenda, without committee review. Should you have any questions or if additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

Attachments:

Exhibit 5.1 – Conceptual Out-of-County Landfill Memo - Arcadis
Exhibit 5.2 – List of Properties with 1000 Acres for Sale in Florida
Exhibit 5.3 – Out-of-County Landfills Property Search Results

c. Geri Bonzon-Keenan, County Attorney
Gerald Sanchez, First Assistant County Attorney
Jess McCarty, Executive Assistant County Attorney
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Exhibit 5.1

Conceptual Out-of-County Landfill Memo (Arcadis)

EXHIBIT 5.1

Memo

ARCADIS

FL Engineering License #7917
FL Geology License #GB564

SUBJECT
Conceptual Out-of-County Landfill

TO
John Wong
Assistant Director, Technical Services and Environmental Affairs Division
Miami-Dade Department of Solid Waste Management
2525 NW 62nd St., 5th Floor
Miami, FL 33147

DATE
June 11, 2025

ARCADIS PROJECT NUMBER
30189215

COPIES TO
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ARCADIS CONTACT
Chris Tilman, PE, BCEE
2811 Ponce de Leon Blvd.
Suite 200
Coral Gables, FL 33134

Purpose:

Describe the assumptions, general locations within the state, and methodology for the preliminary, planning-level cost estimate previously provided for a theoretical Class I landfill owned and operated by Miami-Dade County (County) that is located outside the County boundaries, and to briefly explore costs of rail hauling County waste outside of Miami-Dade County.

Overview:

As requested by the Miami-Dade County Department of Solid Waste Management (Department), Arcadis prepared a conceptual cost estimate for a theoretical Class I landfill located outside the County. Based on discussions with Department staff, the following site criteria were established:

1. Landfill property is a minimum of 1000 acres.
2. Class I landfill with 50-ac disposal cells.
3. Landfill property has road access at the property line.
4. Landfill property has no issues with Karst terrain.
5. Potable water, sanitary sewer, and 480V, three-phase power is available at the property line.
6. Estimate includes the capital and operational costs for 20 years of operations, including initial site development and construction, closure and post-closure costs for nine 50-ac cells.
7. Landfill gas collection system routed to flares.
8. The landfill will be contract operated, all capital equipment will be provided and maintained by the contract operator.
9. No dewatering required for construction.
10. Stormwater detention system with offsite discharge.
11. Groundwater is 5 feet below existing grade.
12. Competent subgrade is 15 feet below existing grade.
13. No wetlands or Endangered Species issues on site.
14. 10-year development time to placement of waste (i.e., Engineering Design, Permitting, Construction, etc.)
15. 3,000,000 tons of waste delivered to the landfill annually, beginning in 2034.

16. Assume rail haul capacity is available and current Waste Management (WM) rate for rail hauling using the Florida East Coast Railway (FEC) Intermodal, loading in Miami and unloading in Ft. Pierce ($34/ton, 2024 Dollars)
17. Assume truck hauling 24 ton load a distance of 100 miles from Intermodal transfer station, 200-mile round trip ($0.16 per ton-mile, 2024 Dollars)
18. Cover material will be available onsite.

The sections that follow provide further detail on the site assumptions and cost considerations.

Location

The basic premise of the landfill is that County waste will be loaded into 40-foot intermodal containers and rail hauled to an intermodal transfer facility, where the containers will be transferred to trucks and driven up to 100 miles to the proposed landfill.

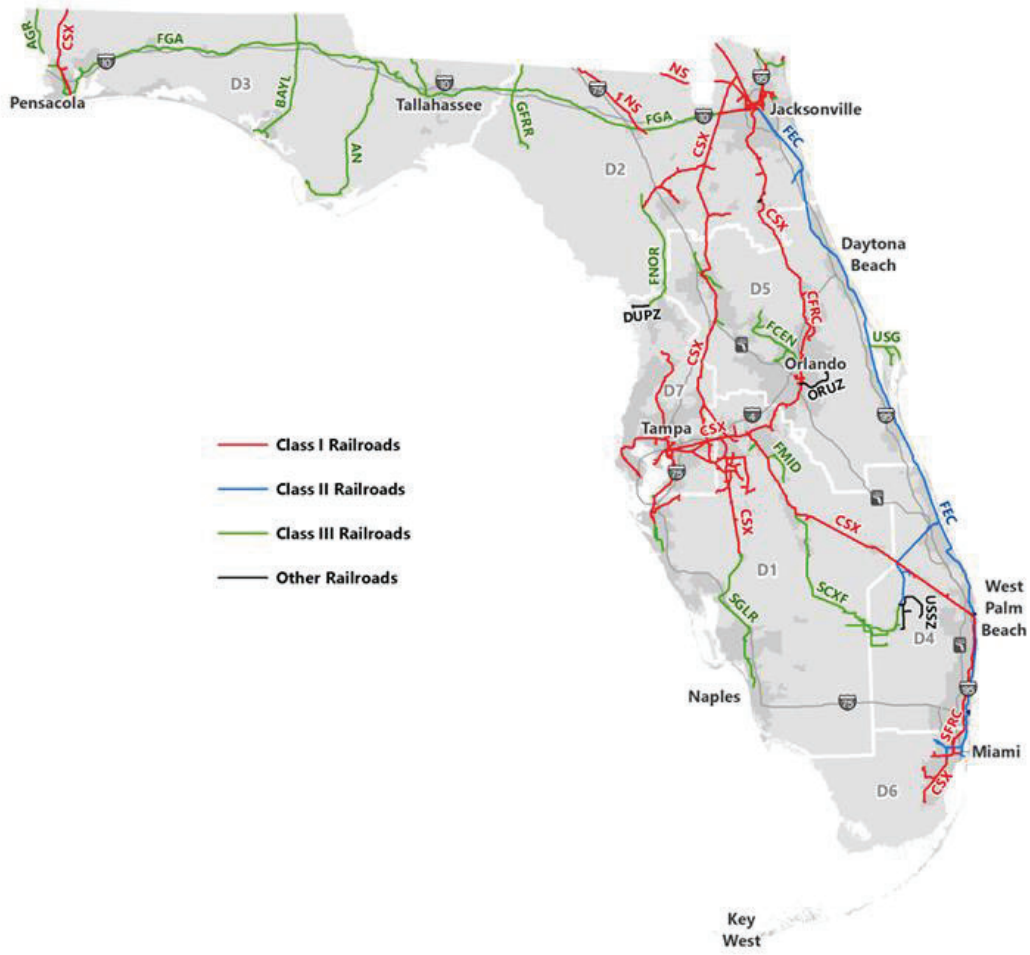


Fig.1. Florida Freight Rail Network, 2023. (Source: FDOT Freight and Rail Office)

The rail hauling is assumed to take place on the FEC rail system (See blue lines in **Fig. 1**), which has intermodal transfer facilities in Miami, Fort Lauderdale, Fort Pierce, Cocoa, and Jacksonville. For costing purposes, the existing WM contract route (loading in Miami and unloading in Fort Pierce) was used, but the rail hauling could unload in Cocoa to expand the possible landfill area. Also, transferring trains to the CSX rail lines at the junction in West Palm Beach and hauling to the existing CSX intermodal facility in Winter Haven could be another option to expand landfill siting possibilities. Interstate rail haul may be possible via CSX rail lines to landfills in Georgia and beyond but would likely increase transport costs and may increase disposal costs. New York City, NY, Los Angeles, CA, and many other municipalities rail haul waste long distances to out of state landfills.

Tracing circles of 100-mile radii from the FEC Fort Pierce and Cocoa Intermodal facilities indicates the possible areas in Florida where the theoretical Class I landfill could be located, as shown in **Fig. 2**. The resulting area covers a significant area of the Florida peninsula and includes portions of more than 20 counties.

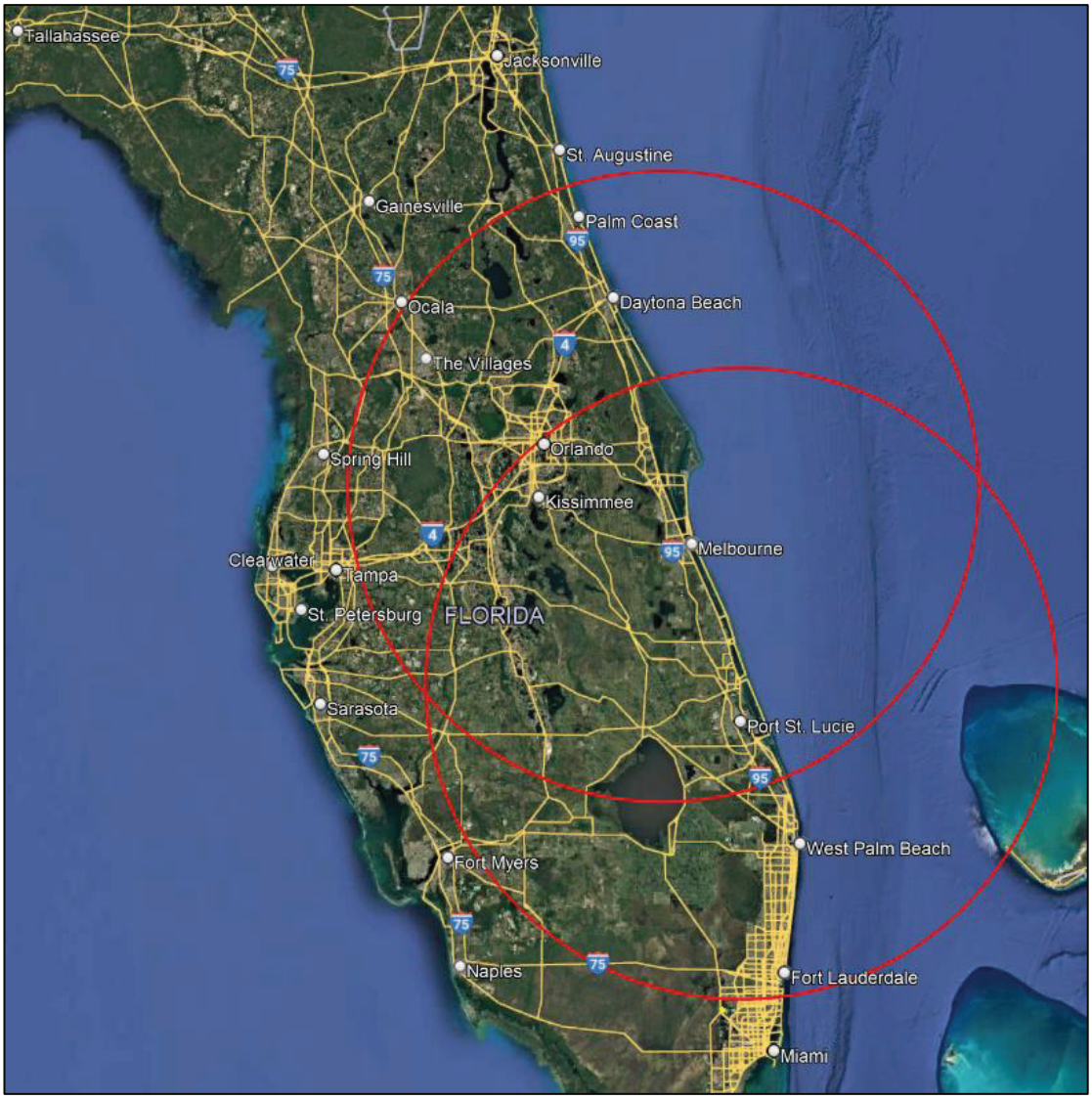


Fig.2. Map of Conceptual Landfill Site Areas based on 100-mile radii from FEC Intermodal Facilities

Site Development

Developing a Class I landfill requires certain geological characteristics to ensure the bottom liners are constructed on a firm foundation and will not exceed settlement tolerances that could compromise liner integrity. In addition, existing road access, availability of water, sewer, and electric utilities and the presence of wetlands or endangered species at the site may affect the development costs and schedule. For estimating purposes Arcadis assumed the following:

1. Landfill property has no issues with Karst terrain.
2. Groundwater is 5 feet below existing grade.

3. Competent subgrade is 15 feet below existing grade. Cells are excavated 15 feet and backfilled to grade.
4. No wetlands or Endangered Species issues on site.
5. 10-year development time to placement of waste (i.e., Engineering Design, Permitting, Construction, etc.). This also includes assumed time for negotiations between the host county and Miami-Dade County, and more importantly assumes that all required local, State, and Federal approvals for landfill siting can be secured.
6. Potable water, sanitary sewer, and 480V, three-phase power is available at the property line.

Although not specifically listed, Arcadis assumed that the site would be essentially clear of trees and other heavy vegetation, likely a former ranch or agricultural property. If the site is extensively vegetated, clearing the trees and vegetation would incur additional costs.

Landfill Site Layout

For cost estimating purposes, Arcadis assumed that the landfill site would have a total property area of 1,000 acres, which includes areas for the landfill cells, stormwater management system, roads, scalehouse, a maintenance building, landfill flare, and other systems required for proper landfill operations. The following site assumptions were used:

1. Landfill property is a minimum of 1,000 acres, with an estimated 2025 cost of $11,819 per acre based on the results of the Miami Dade Internal Services Department (ISD) real estate report dated May 27, 2025.
2. Class I landfill with nine 50-ac disposal cells.
3. Landfill gas collection system routed to flares.
4. 10-year development time to placement of waste (i.e., Engineering Design, Permitting, Construction, etc.)

Landfill Operations

Based on direction from Department staff, Arcadis assumed the following:

1. 3,000,000 tons of waste would be delivered to the landfill annually, beginning in 2034.
2. The landfill will be contract operated, all capital equipment will be provided and maintained by the contract operator.
3. Rail haul capacity is available and current Waste Management (WM) rate for rail hauling using the Florida East Coast Railway (FEC) Intermodal, loading in Miami and unloading in Ft. Pierce ($34/ton, 2024 Dollars)
4. Assume truck hauling 24 ton load a distance of 100 miles from the Intermodal transfer station, 200-mile round trip (assumed all-in cost of $0.16 per ton-mile, $32/ton, 2024 Dollars)
5. Cover material will be available onsite.

Schedule Considerations

Based on landfilling 3,000,000 tons of waste annually, for 20 years of operation approximately nine 50-acre landfill cells would be needed. Therefore, the Arcadis estimate includes the capital and operational costs for 20 years of operations, including initial site development and construction, closure and post-closure costs for nine 50-ac cells.

Capital and Operating Costs

Table 1 below shows the planning-level estimated capital, operating, and closure and long-term care costs for the conceptual out-of-county landfill based on the assumptions provided.

Table 1. Planning-Level Estimated Costs for Conceptual Out-Of-County Landfill

Estimated Cost	2024 Dollars	2034 Dollars	2054 Dollars
Capital Costs (9 Cells)	$1.06B	$1.43B	$2.57B
Operating Costs	$293M	$393M	$529M
Closure and Long-Term Care Costs	$142M	$191M	$256M
Total Year 1 Costs (Cell 1 Only)	$614M	$825M	---
Total Cumulative 20-Year Costs	$2.69B		

Out-of-County Rail Haul

If Miami-Dade County were to opt for rail haul disposal of solid waste outside the county or the state, the waste tonnage that the County manages would likely require multiple disposal facilities, resulting in a complex rail transport operation and increasing costs. There are a few rail accessible landfills within the state and many others located throughout the Southeast that could provide disposal capacity for the County waste. Based on recent data, the transport cost for rail haul of more than 300 miles ranges from approximately $0.10 - $0.25 per ton-mile, including intermodal container loading and unloading costs. Rail haul distances less than 300 miles increase the costs, to approximately $0.25 - $0.50 per ton-mile.

Capital and Operating Costs

Assuming a train length of 120 flatcars, double stacked with 40-foot intermodal containers holding 24 tons of solid waste each, approximately 70-80 trains would be required to transport three million tons of waste per year from Miami-Dade County to an out-of-county landfill. **Table 2** and **Table 3** below show planning-level estimated capital and operating costs for rail hauling to an out-of-county landfill based on the assumptions provided.

Fig.3. Los Angeles Solid Waste Multi-Modal Rail Haul Train (Photo Courtesy Waste Dive)

FEC and CSX have access to several landfill facilities in Florida and throughout the southeastern United States with multi-modal transport service (see **Fig. 3**), shown in **Table 3** below. The table shows conceptual rail hauling distances and costs for 3,000,000 tons per year of waste routed to a single disposal facility and does not include costs for truck transport of intermodal containers from the intermodal transfer station to the landfill and back or landfill disposal charges. Note that other disposal facilities and rail carriers are available, and further analysis would be needed to determine what combination of railways and facilities would be needed to dispose of the County's waste tonnage outside Florida.

Table 2. Estimated Out-of-County Rail Haul Capital Costs (70-80 Trains)

Item	Qty	Unit Cost	Total Cost
Standard rail flatcar	8,400 – 9,600	$120,000	$1B - $1.2B
Standard 40-ft intermodal container	16,800 – 19,200	$5,000	$84M - $96M
Total Capital Costs			$1.08B - $1.3B

Table 3. Estimated Rail Haul Costs for 3M Tons Annually From FEC Miami to Selected Landfills*

Facility	Est. Rail Haul Distance	Est. Annual Rail Haul Cost	Est. Rail Haul Cost Per Ton
Blue Sky Landfill, AL	830 mi	$249M- $374M	$83 - $125
Republic Services, Bishopville, SC	800 mi	$240M - $360M	$80 - $120
Taylor County Landfill, Mauk, GA	650 mi	$195M - $293M	$65 - $98
Okeechobee Landfill, Okeechobee, FL	110 mi	$50M - $83M	$17 - $28
Heart of Florida Landfill, Lake Panasoffkee, FL	260 mi	$117M- $195M	$39 - $65

*Note: Estimated costs shown do not include truck transport to/from intermodal facility or landfill disposal costs.

Considerations

Please note that the cost estimates presented in this memo are entirely conceptual and much more detailed analysis would be required to determine their feasibility and present more accurate estimates.

Development of a landfill by Miami-Dade County outside its borders, if possible, would be a lengthy and expensive process. The closest example might be the development of the Lee/Hendry Regional Solid Waste Disposal Facility, which serves both those counties, but for Miami-Dade the size of the landfill required for a reasonable service life would suggest that the facility might be a regional landfill serving several counties. If such arrangements could be made, then the cost impacts to Miami-Dade County might be reduced.

Development of a landfill by Miami-Dade County in another county that only receives Miami-Dade County waste would require negotiations and approval by the host county.

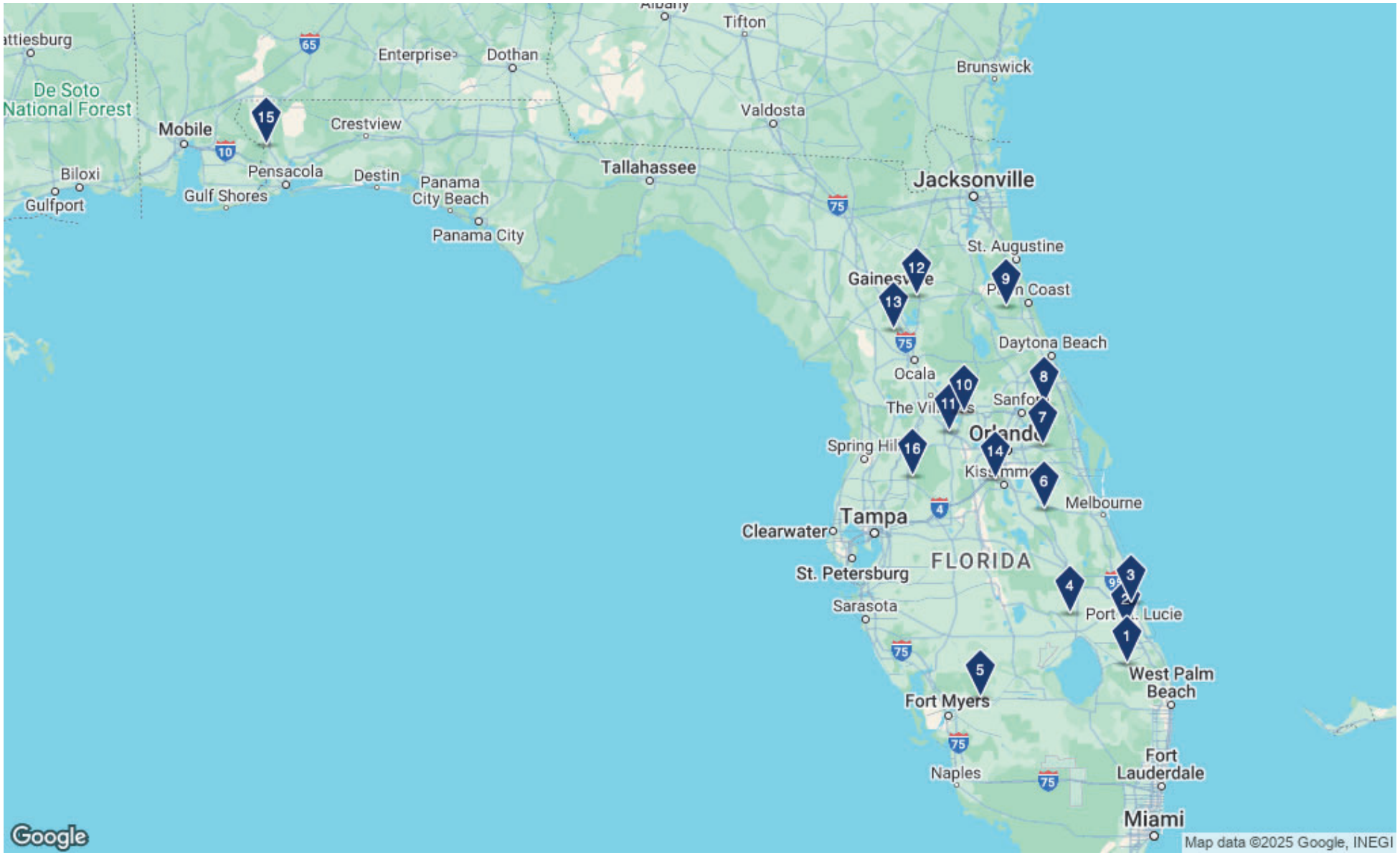
Exhibit 5.2

List of 1000-Acre Properties for Sale in Florida

EXHIBIT 5.2

For Sale Map Overview

MDC159



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For Sale Summary Report

For Sale: 11500 Warfield Blvd - SPORTMANS PARADISE

Indiantown, FL 34956 - Martin Inland Submarket

FOR SALE DETAILS

Price	Not Disclosed
Time On Market	2 Months 10 Days
Last Updated	Apr 17, 2025
Status	Active
Sale Type	Investment

LAND

Land Acres	1,512.00 AC
Zoning	AG20
Off Sites	No Cable, No Curb/Gutter/Sidewalk, Electricity, No Gas, No Irrigation, No
Land SF	65,862,720 SF

SALES CONTACTS

Sales Company	Webster's International Realty Brian Webster 4440 Pga Blvd, Suite 600 Palm Beach Gardens, FL 33410 United States (561) 262-4564 (p)

SALE HIGHLIGHTS

- GREAT HUNTING AND SHOOTING PROPERTY IN A SUPERIOR LOCATION, ABUNDANT DEER, HOG AND TURKEY

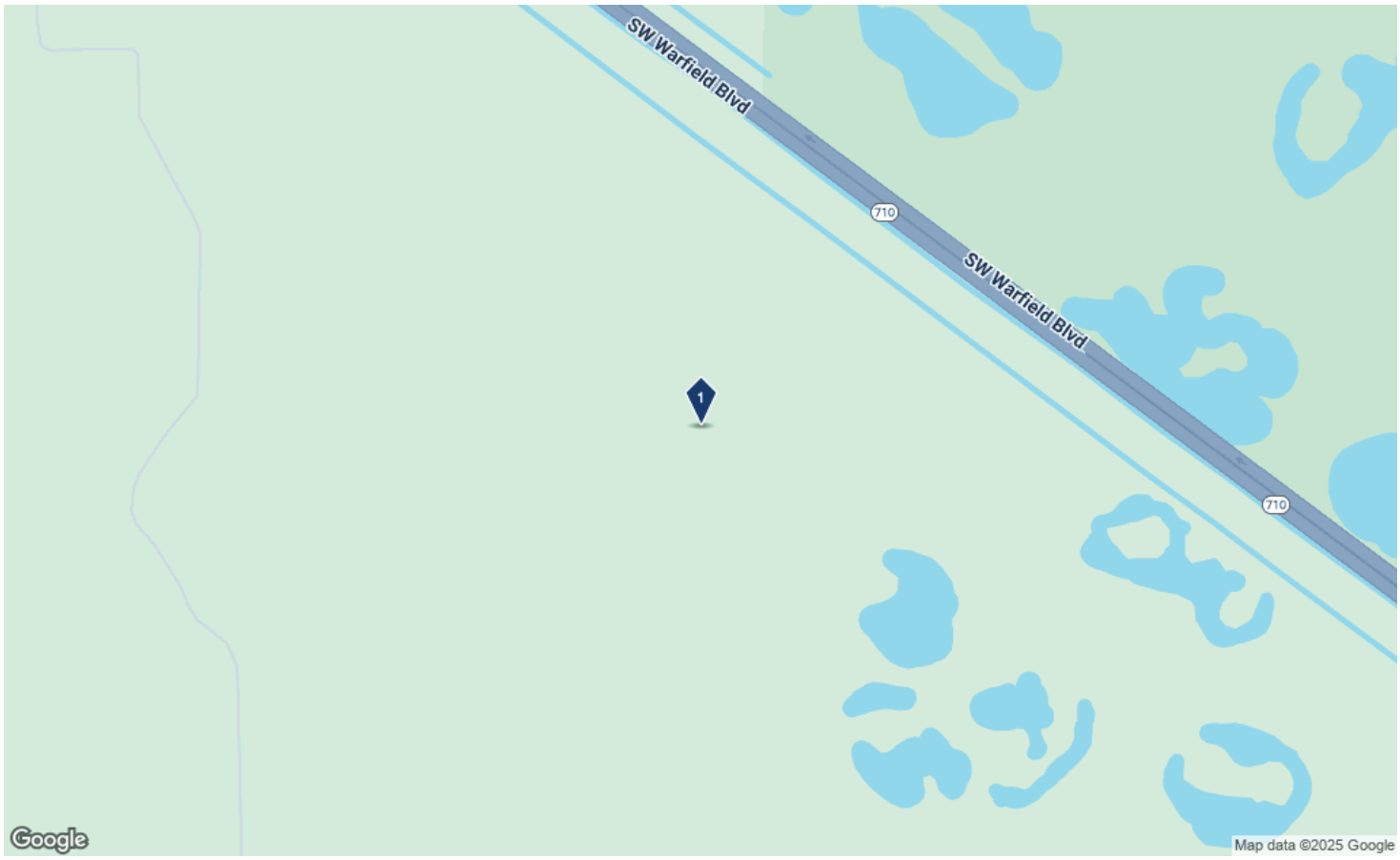
SALE NOTES

1512 ACRES OF SUPERIOR HUNTING AND SHOOTING LAND
GREAT FOR A PRIVATE CLUB
FANTASTIC LOCATION
ZONED AG20 OR 1 UNIT PER 20 ACRES
CALL FOR PRICING

For Sale Summary Report

For Sale: 11500 Warfield Blvd - SPORTMANS PARADISE

Indiantown, FL 34956 - Martin Inland Submarket



LOCATION

Zip	34956
Submarket	Martin Inland
Submarket Cluster	Martin Inland
Market	Port St Lucie/Fort Pierce
County	Martin
State	FL
CBSA	Port St Lucie, FL
DMA	West Palm Beach-Ft Pierce, FL

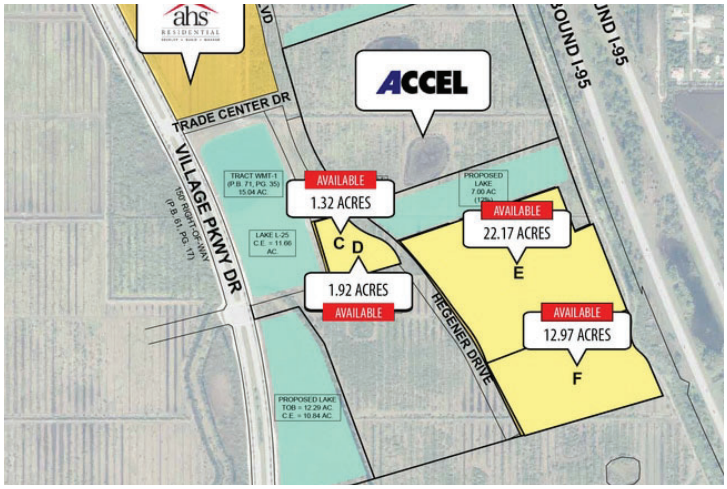
TRANSPORTATION

Airport	47 min drive to Palm Beach International

For Sale Summary Report

For Sale: SW Discovery Way & Village Parkway Way - Tradition Center for Commerce - Port St Lucie

Port Saint Lucie, FL 34953 - St Lucie Inland Submarket



FOR SALE DETAILS

Price	Not Disclosed
Time On Market	5 Years 3 Months
Last Updated	Mar 17, 2025
Status	Active
Sale Type	Investment or Owner User

LAND

Land Acres	1,186.93 AC
Zoning	Commercial
Parcels	4315-804-0003-000-8
Topography	Level
Current Use	Vacant Industrial
Proposed Use	Apartment Units, Commercial, Industrial, Medical, Mixed Use, Multi-
Off Sites	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, No Irrigation,
On Sites	Rough graded
Land SF	51,702,671 SF

SALES CONTACTS

Sales Company

TAMBONE COMPANIES

Tambone Companies
Richard Tambone
3710 Buckeye St, Suite 100
Palm Beach Gardens, FL 33410
United States

For Sale Summary Report

For Sale: SW Discovery Way & Village Parkway Way - Tradition Center for Commerce - Port St Lucie

Port Saint Lucie, FL 34953 - St Lucie Inland Submarket

SALE HIGHLIGHTS

- I-95 Frontage
- Easy Access to I-95, Florida's Turnpike, and US Highway 1
- Immediate Development Opportunities- Industrial Land / Build to Suit
- Parcels can be Combined or Subdivided

SALE NOTES

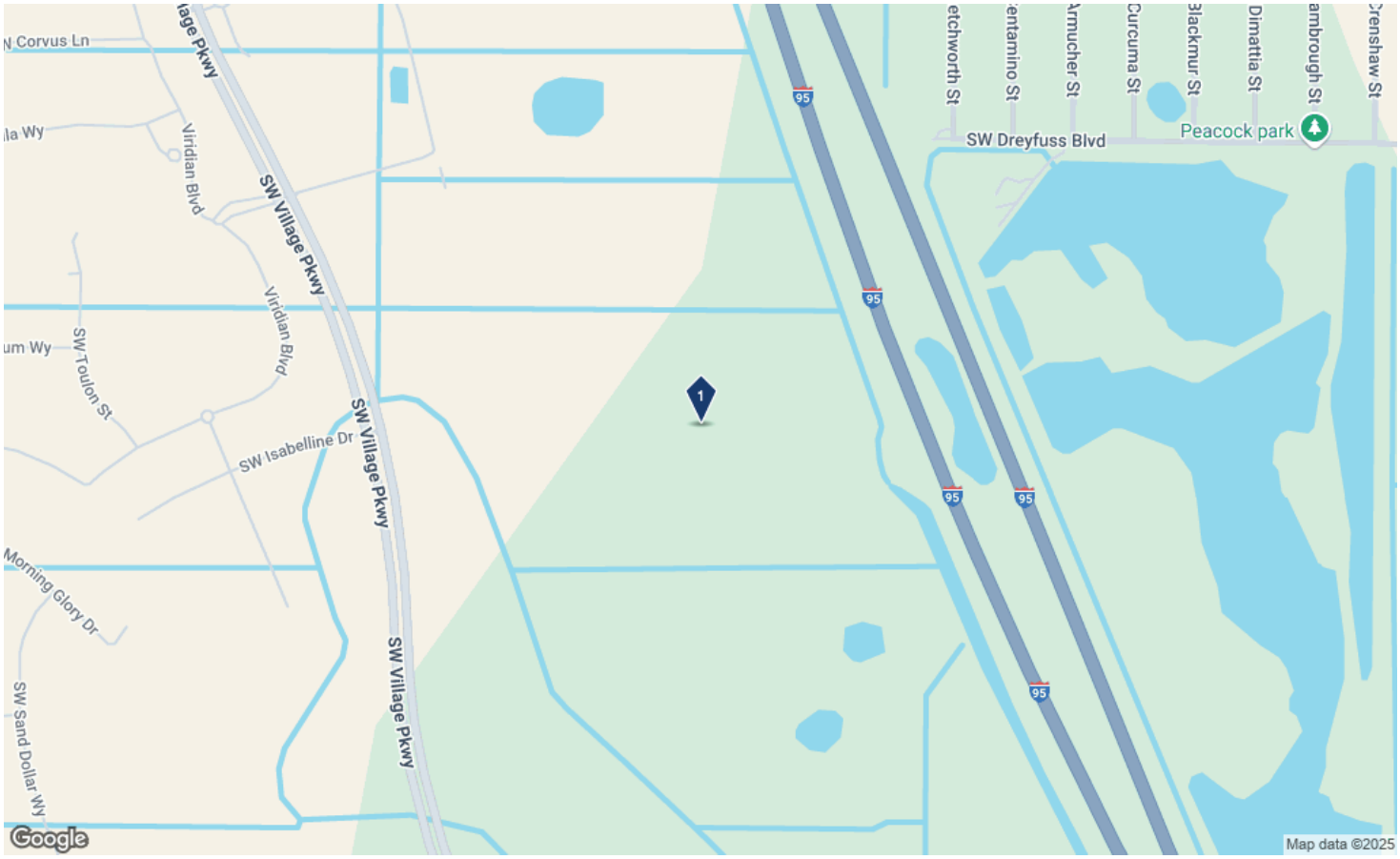
In partnership with the City of Port St. Lucie, we are proud to represent Phase I (84 acres of land) at The Tradition Center for Commerce, located in Tradition at Port St. Lucie, Florida. Tradition Center for Commerce contains 1,247 acres of developable land and is approved for a mix of uses including office, medical, retail, industrial, multi-family residential, recreational, entertainment, and more. The largest plat of developable land from Saint Lucie to Miami-Dade County, Tradition Center for Commerce offers 3.7 miles of I-95 frontage, and easy access to I-95, the Florida Turnpike, & US Highway 1.

More information can be found below and online at TamboneTradition.com

For Sale Summary Report

For Sale: SW Discovery Way & Village Parkway Way - Tradition Center for Commerce - Port St Lucie

Port Saint Lucie, FL 34953 - St Lucie Inland Submarket



LOCATION

Zip	34953
Submarket	St Lucie Inland
Submarket Cluster	St Lucie Inland
Market	Port St Lucie/Fort Pierce
County	St Lucie
State	FL
CBSA	Port St Lucie, FL
DMA	West Palm Beach-Ft Pierce, FL

TRANSPORTATION

Walk Score®	Car-Dependent (4)

For Sale Summary Report

For Sale: SW Discovery Way & Village Parkway Way - Tradition Center for Commerce - Port St Lucie

Port Saint Lucie, FL 34953 - St Lucie Inland Submarket

NEARBY SALE COMPARABLES

Address	Name	Rating	Yr Blt/Renov	Size	Sale Date	Sale Price	Price/AC
Orange Avenue	Prime 1,218 acre Orange Ave. Frontage	★★☆☆☆			Jul 2024	$15,000,000	$12,315

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For Sale Summary Report

For Sale: 5304 Okeechobee Rd - ZONED GENERAL COMMERCIAL

Fort Pierce, FL 34947 - Fort Pierce Submarket

FOR SALE DETAILS

Price	$255,000
Price/SF	$0.00
Price/AC	$18
Time On Market	8 Days
Last Updated	May 19, 2025
Status	Active
Sale Type	Investment or Owner User

LAND

Land Acres	14,000.00 AC
Parcels	2419-601-0002-000-1
Proposed Use	Commercial
Off Sites	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, No Irrigation,
Land SF	609,840,000 SF

SALES CONTACTS

Sales Company

Castelli Real Estate Services
Annamaria Farkas
2205-2227 Wilton Dr
Wilton Manors, FL 33305
United States
(954) 563-9889 (p)

SALE HIGHLIGHTS

- High-Demand Area w/ New Construction & Development Nearby
- Prime Commercial Lots – Up to 0.74 Acres Total AVAILABLE! It can be purchased with lot next door. Inquire about price.
- Many uses, zoned GENERAL COMMERCIAL!

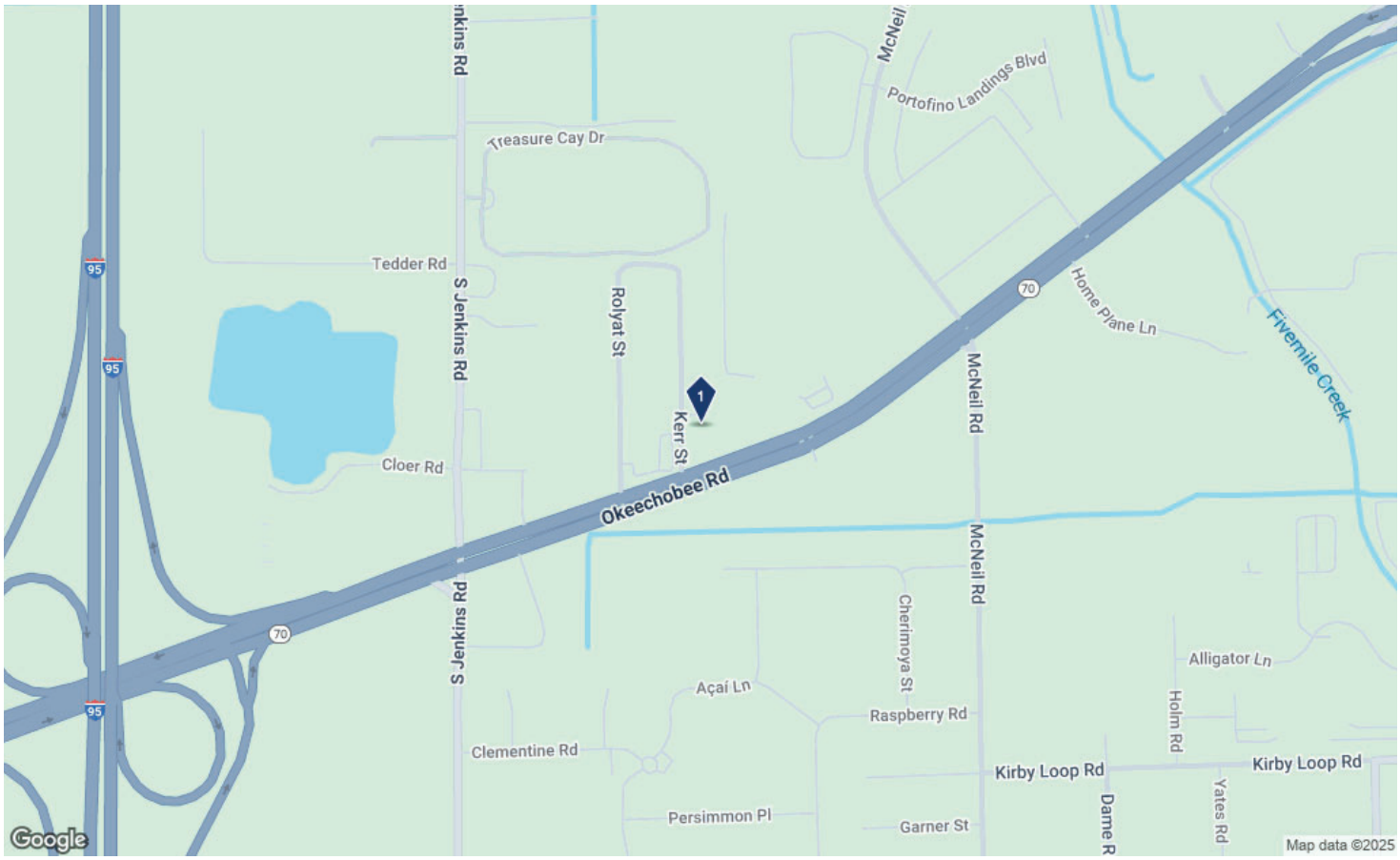
SALE NOTES

Prime Commercial Lots – Up to 0.74 Acres Total AVAILABLE! High-Traffic Location close to Okeechobee Rd. This offering includes a 0.32-acre cleared lot, w/ the option to purchase the adjacent lot, bringing the total to 0.74 acre, ideal for larger-scale commercial projects such as a strip center, retail plaza, office complex, or more. General Commercial-zoned land in one of the fastest-growing areas! Key Features: 0.32 Acres, Can be combined w/ adjacent lot for 0.74 Acres Total, General Commercial Zoning, City/County Easement on E Side, Outstanding Visibility & Access on Okeechobee Rd, Surrounded by Major Retailers: Starbucks, Wawa, Chick-fil-A, restaurants, shopping plazas, Close to I-95, easy access for Commuters & Deliveries, High-Demand Area w/ New Construction & Development Nearby.

For Sale Summary Report

For Sale: 5304 Okeechobee Rd - ZONED GENERAL COMMERCIAL

Fort Pierce, FL 34947 - Fort Pierce Submarket



LOCATION	
Zip	34947
Submarket	Fort Pierce
Submarket Cluster	Fort Pierce
Market	Port St Lucie/Fort Pierce
County	St Lucie
State	FL
CBSA	Port St Lucie, FL
DMA	West Palm Beach-Ft Pierce, FL

TRANSPORTATION	
Walk Score®	Car-Dependent (48)

For Sale Summary Report

For Sale: 3893 NW 50th Drive - Taylor Creek Ranch

Okeechobee, FL 34972 - Florida Central South Area Submarket

FOR SALE DETAILS

Price	Not Disclosed
Time On Market	2 Years 10 Months
Last Updated	Apr 19, 2025
Status	Active
Sale Type	Investment or Owner User

LAND

Land Acres	2,278.00 AC
Zoning	AG
Topography	Rolling
Proposed Use	Agricultural
On Sites	Raw land
Land SF	99,229,680 SF

SALES CONTACTS

Sales Company	T & D Realty and Assoc., Inc. Theresa Bowman 14339 Smith Sundy Rd Delray Beach, FL 33446 United States (561) 441-1292 (p)
Sales Company	T&D Realty & Associates Inc. Richard Bowman 14339 Smith Sundy Rd Delray Beach, FL 33446 United States

SALE HIGHLIGHTS

- 15 minutes from the Okeechobee County Airport
- Currently Listing 2278 +/- acres for sale, (a portion of a larger parcel)

SALE NOTES

For Sale Summary Report

For Sale: 3893 NW 50th Drive - Taylor Creek Ranch

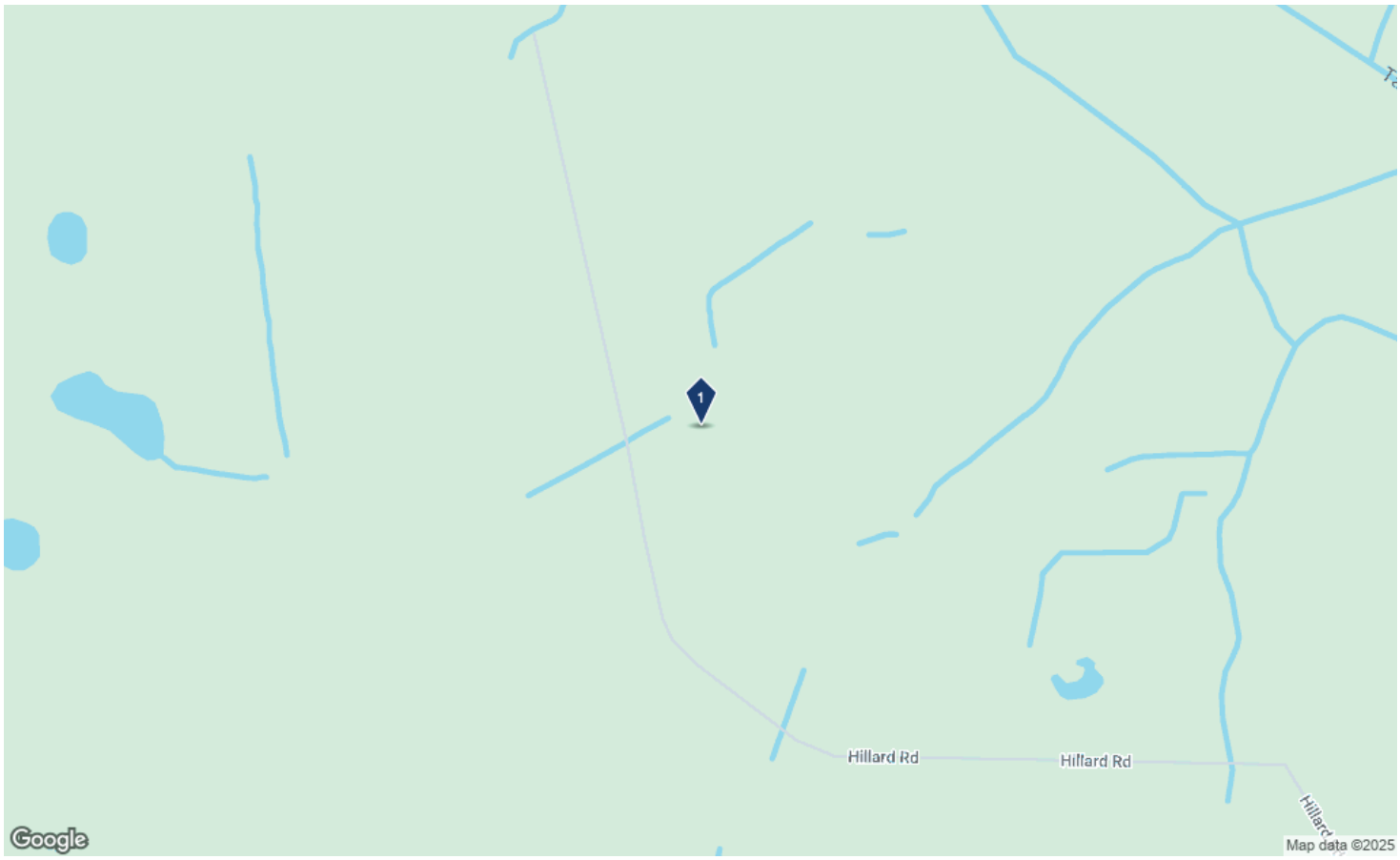
Okeechobee, FL 34972 - Florida Central South Area Submarket

Currently Listing +/- 2278 acres for sale
15 minutes from the Okeechobee County Airport

For Sale Summary Report

For Sale: 3893 NW 50th Drive - Taylor Creek Ranch

Okeechobee, FL 34972 - Florida Central South Area Submarket



LOCATION

Zip	34972
Submarket	Florida Central South Area
Submarket Cluster	Florida Central North
Market	Other Market Areas
County	Okeechobee
State	FL
CBSA	Okeechobee, FL
DMA	West Palm Beach-Ft Pierce, FL

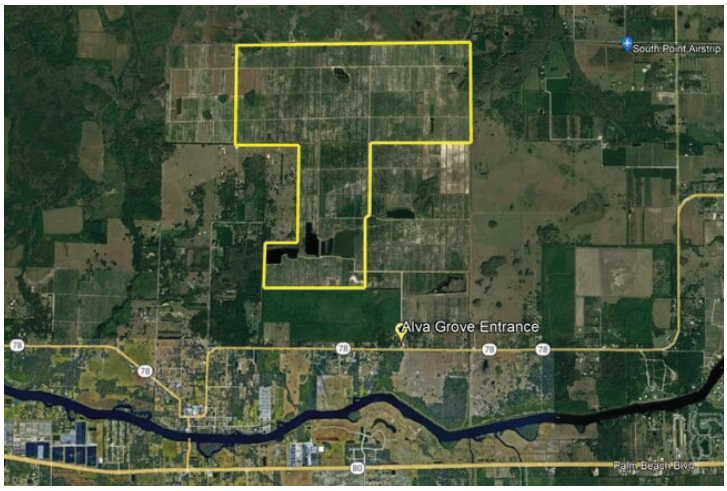
TRANSPORTATION

Commuter Rail	23 min drive to Okeechobee Amtrak (Silver Star - Amtrak)

For Sale Summary Report

For Sale: 23351 N River Rd - Alva Grove

Alva, FL 33920 - North Ft Myers Submarket



FOR SALE DETAILS

Price	$4,000,000 - 11,200,000
Price/SF	$0.18
Price/AC	$8,000
Time On Market	6 Months 14 Days
Last Updated	Apr 25, 2025
Status	Active
Sale Type	Investment or Owner User

LAND

Land Acres	1,900.00 AC
Zoning	Agriculture
Parcels	11-43-27-00-00001.0580, 11-43-27-00-00001.0590,
Topography	Level
Current Use	Raw Vacant Land
Proposed Use	Agribusiness, Agricultural, Hold for Investment, Pasture/Ranch, Planned
Off Sites	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, No Irrigation,
On Sites	Raw land
Land SF	82,764,000 SF

SALES CONTACTS

Sales Company	Florida Agri Properties Inc Joey Beale 5105 SE Williams Way Stuart, FL 34997 United States (772) 532-9494 (p)
Recorded Owner	F C C Mgmt Co 3245 Okeechobee Rd Fort Pierce, FL 34947 United States

SALE HIGHLIGHTS

- Excellent Drainage and Irrigation from high quality surface water
- Suitable for large variety of agricultural production including citrus, sod, row crops, and vegetables
- Drainage ditches and roadways maintained by County line drainage district
- Turn key for farming as all irrigation and drainage is in place and operable

For Sale Summary Report

For Sale: 23351 N River Rd - Alva Grove

Alva, FL 33920 - North Ft Myers Submarket

- Strong long term development potential with close proximity to Fort Myers and Babcock Village

SALE NOTES

Prime Agricultural Land for Sale – Up to 1,400 Acres in Alva, Florida
Minimum Purchase: 500 Acres

Located in the desirable northeast corner of Lee County and bordered by the expansive Babcock Ranch Preserve to the north, this 1,400-acre property presents a rare opportunity to acquire highly-productive agricultural land with strong long-term development potential. Just 30 minutes from Fort Myers International Airport and a mere 5 miles from the rapidly growing Babcock Ranch Villages, this property offers both immediate usability and future upside.

Agricultural Ready – Turnkey Infrastructure in Place
Formerly in citrus production and fallow for the past three years, the land is fully equipped for a wide variety of agricultural uses. Highlights include:

Exceptional Irrigation & Drainage:
A micro-jet irrigation system spans the entire property, supplied by 12” main lines and powered by reliable Tier 3 diesel pump units—favored for their performance and simplicity (no DEF required). The system draws from a high-quality surface water reservoir with a unique recharge capability, making groundwater wells unnecessary.

Superior Drainage Management:
The property is part of a Florida 298 Drainage District, ensuring consistent maintenance of all ditches and roadways—critical for operational reliability and long-term sustainability.

Strategic Location with Development Potential
While its primary use is agricultural, the property’s proximity to major infrastructure and residential expansion zones make it a compelling hold for future development. The nearby Babcock Ranch Villages represent one of Florida’s most innovative planned communities, enhancing the land’s strategic value.

Key Features:
- Up to 1,400 acres available (minimum purchase: 500 acres)
- Directly borders Babcock Ranch Preserve
- 30 minutes to Fort Myers International Airport
- Premier surface water irrigation system
- FL 298 Drainage District membership
- Ideal for citrus, row crops, or specialty agriculture
- Excellent access and internal roadways

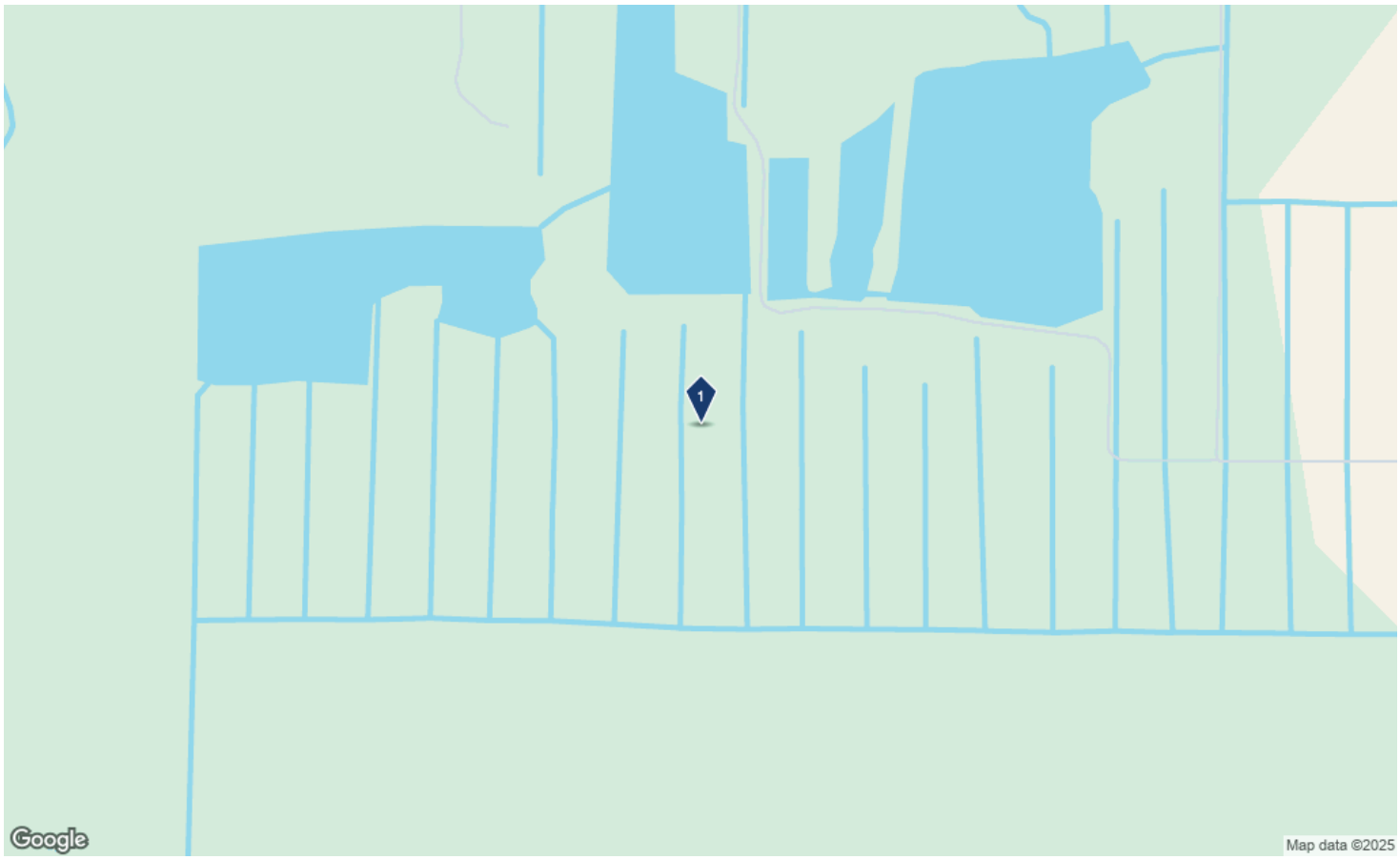
Whether you're looking to expand agricultural operations or invest in Florida’s future growth, this Alva property offers unmatched versatility, infrastructure, and location.

Inquiries and tours available by appointment.

For Sale Summary Report

For Sale: 23351 N River Rd - Alva Grove

Alva, FL 33920 - North Ft Myers Submarket



LOCATION

Zip	33920
Submarket	North Ft Myers
Submarket Cluster	Lee County
Market	Southwest Florida
County	Lee
State	FL
CBSA	Cape Coral-Fort Myers, FL
DMA	Ft Myers-Naples, FL

TRANSPORTATION

Airport	46 min drive to Southwest Florida International

For Sale Summary Report

For Sale: 23351 N River Rd - Alva Grove

Alva, FL 33920 - North Ft Myers Submarket

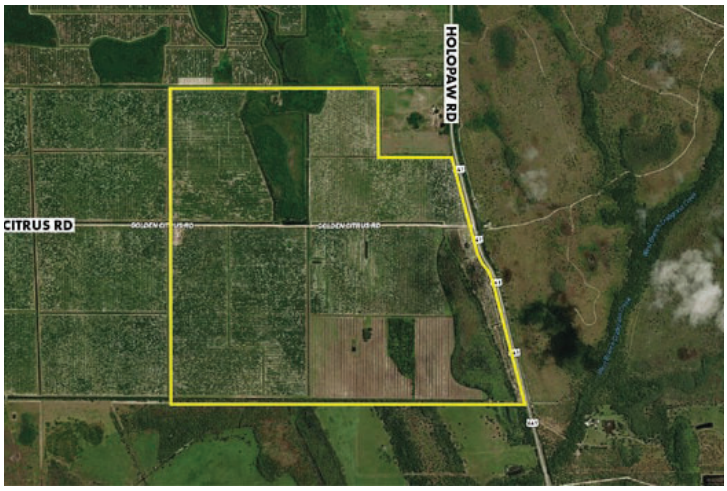
NEARBY SALE COMPARABLES

Address	Name	Rating	Yr Blt/Renov	Size	Sale Date	Sale Price	Price/AC
21121 Granville Rd	Stolle Ranch	★★☆☆☆			May 2023	$17,000,000	$6,171

For Sale Summary Report

For Sale: 6220 Holopaw - Citrus Grove in Osceola County

Saint Cloud, FL 34773 - Osceola Outlying Submarket



FOR SALE DETAILS

Price	Not Disclosed
Time On Market	1 Month 14 Days
Last Updated	Apr 28, 2025
Status	Active
Sale Type	Owner User

LAND

Land Acres	5,060.00 AC
Zoning	A/C
Parcels	35-27-32-0000-0010-0000
Topography	Level
Current Use	Vacant Lot
Proposed Use	Agribusiness, Agricultural, Golf Course/Driving Range, Single Family
Off Sites	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, Irrigation, No
On Sites	Raw land
Land SF	220,413,600 SF

SALES CONTACTS

Sales Company	Epic Estates Venkatesh Yerramsetty 708 Horizon St Flower Mound, TX 75028 United States (972) 636-5844 (p)
Recorded Owner	Epic Estates St Cloud Llc
True Owner	Epic Estates 708 Horizon St Flower Mound, TX 75028 United States (972) 636-5844 (p)

SALE NOTES

Welcome to a rare opportunity to own a magnificent 5000-acre property near St. Cloud, Florida. This expansive tract of land boasts 3700 feet of impressive frontage on HWY 441, providing excellent accessibility and visibility. Located just around 5 minutes from State HWY 192, the property is in close proximity to the Osceola County urban service boundary, making it an attractive investment for unique development projects.
Prime Location
Situated only 40 minutes from Orlando International Airport, this property offers the perfect blend of serenity and convenience. Orlando's North and West regions are fully developed, making the Southeast direction the next target for growth and expansion. This area is in the direct path of development, ensuring a promising future for any ventures undertaken here.
Versatile Development Potential

For Sale Summary Report

For Sale: 6220 Holopaw - Citrus Grove in Osceola County

Saint Cloud, FL 34773 - Osceola Outlying Submarket

Spanning an impressive 5000 acres, the property is ideally suited for luxury 5-acre ranchettes, flying communities, equestrian ranchettes, and even a world-class golf course. The vastness of the land provides ample space to create a bespoke community tailored to your vision.
Current Utilization
Currently, 2000 acres of the property are leased to a thriving sod farm, offering a steady stream of income. Additionally, 1200 acres are leased to a productive citrus grove, further enhancing the property's value and versatility. These existing leases demonstrate the land's fertility and potential for agricultural endeavors.
Exceptional Accessibility
The extensive 3700 feet of frontage on HWY 441 guarantees easy access for residents and visitors alike. The property's strategic location near major highways ensures seamless connectivity to surrounding areas, facilitating growth and development.
A Rare Market Opportunity
Large tracts of land like this are increasingly rare in today's market. The significant acreage combined with the prime location makes this property a coveted asset for developers, investors, and visionaries. Whether you aim to create an exclusive residential community, a premier equestrian estate, or a designer golf course, the possibilities are endless.
Close Proximity to Urban Services
Being near the Osceola County urban service boundary adds an invaluable advantage, providing access to essential utilities and services that support development. This proximity ensures that any project undertaken here will benefit from existing infrastructure, making the development process smoother and more cost-effective.
Growth Path Potential
The property lies within the Southeast growth corridor, a region poised for significant development in the coming years. As Orlando continues to expand, this area is set to become a vibrant hub of activity, making it an ideal location for forward-thinking ventures.
Invest in the Future
Secure your place in the burgeoning landscape of Southeast Orlando with this extraordinary 5000-acre property. The combination of location, size, and development potential presents a unique opportunity to create something truly exceptional. Don't miss out on the chance to own a piece of paradise and shape the future of this thriving region.
For more information or to arrange a viewing, please contact us . This is your moment to turn your vision into reality and be part of the dynamic growth that defines Southeast Orlando.

https://id.land/ranching/maps/a5bbca79238b3f59b0dca5d4ff32d2eb/share/unbranded

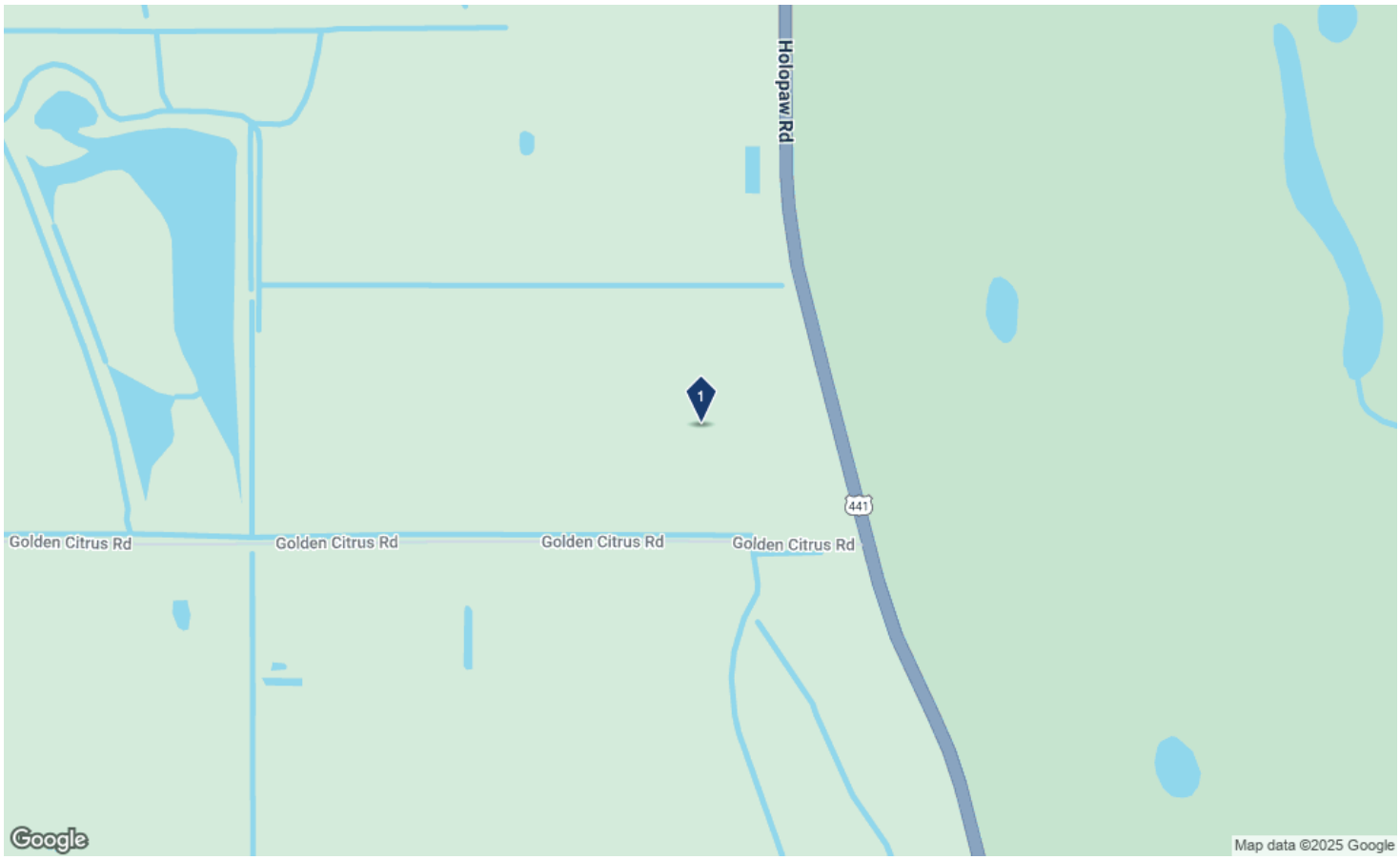
SALE HISTORY

Sale Date	Price	Sale Type	Buyer	Seller
May 2024	$22,000,000 ($14,648/AC)	Investment	Epic Estates	Evander B Conoley

For Sale Summary Report

For Sale: 6220 Holopaw - Citrus Grove in Osceola County

Saint Cloud, FL 34773 - Osceola Outlying Submarket



LOCATION

Zip	34773
Submarket	Osceola Outlying
Submarket Cluster	South Outlier
Market	Orlando
County	Osceola
State	FL
CBSA	Orlando-Kissimmee-Sanford, FL
DMA	Orlando-Daytona Beach-Melbourne, FL

TRANSPORTATION

Airport	47 min drive to Melbourne Orlando International

For Sale Summary Report

For Sale: 6220 Holopaw - Citrus Grove in Osceola County

Saint Cloud, FL 34773 - Osceola Outlying Submarket

NEARBY SALE COMPARABLES

Address	Name	Rating	Yr Blt/Renov	Size	Sale Date	Sale Price	Price/AC
Canoe Creek Rd	South Lake Toho Development Tract	★★☆☆☆			Dec 2024	$110,000,000	$34,066

For Sale Summary Report

For Sale: 19543 E Colonial Dr - 1,100+/- ac Waterfront Development Property i

Orlando, FL 32820 - SE Orange Outlying Submarket

FOR SALE DETAILS

Price	Not Disclosed
Time On Market	1 Month 3 Days
Last Updated	May 1, 2025
Status	Active
Sale Type	Investment or Owner User

LAND

Land Acres	1,100.00 AC
Zoning	PD, A-2
Parcels	23-2232-0000-00-001, 23-2232-0000-00-004,
Topography	Rolling
Current Use	None
Proposed Use	Commercial, Master Planned Community, Planned Unit Development
On Sites	Raw land
Land SF	47,916,000 SF

SALES CONTACTS

Sales Company

Maury L. Carter & Associates, Inc.
Daryl Carter
3333 S Orange Ave, Suite 200
Orlando, FL 32806
United States
(407) 422-3144 (p)

SALE HIGHLIGHTS

- 5+/- miles of water frontage
- 1+/- mile of road frontage on E. Colonial Dr.
- Less than a 30 minute drive to Winter Park, Lake Nona, Oviedo, and to both Orlando International Airport and Sanford-Orlando International Airport

For Sale Summary Report

For Sale: 19543 E Colonial Dr - 1,100+/- ac Waterfront Development Property i

Orlando, FL 32820 - SE Orange Outlying Submarket

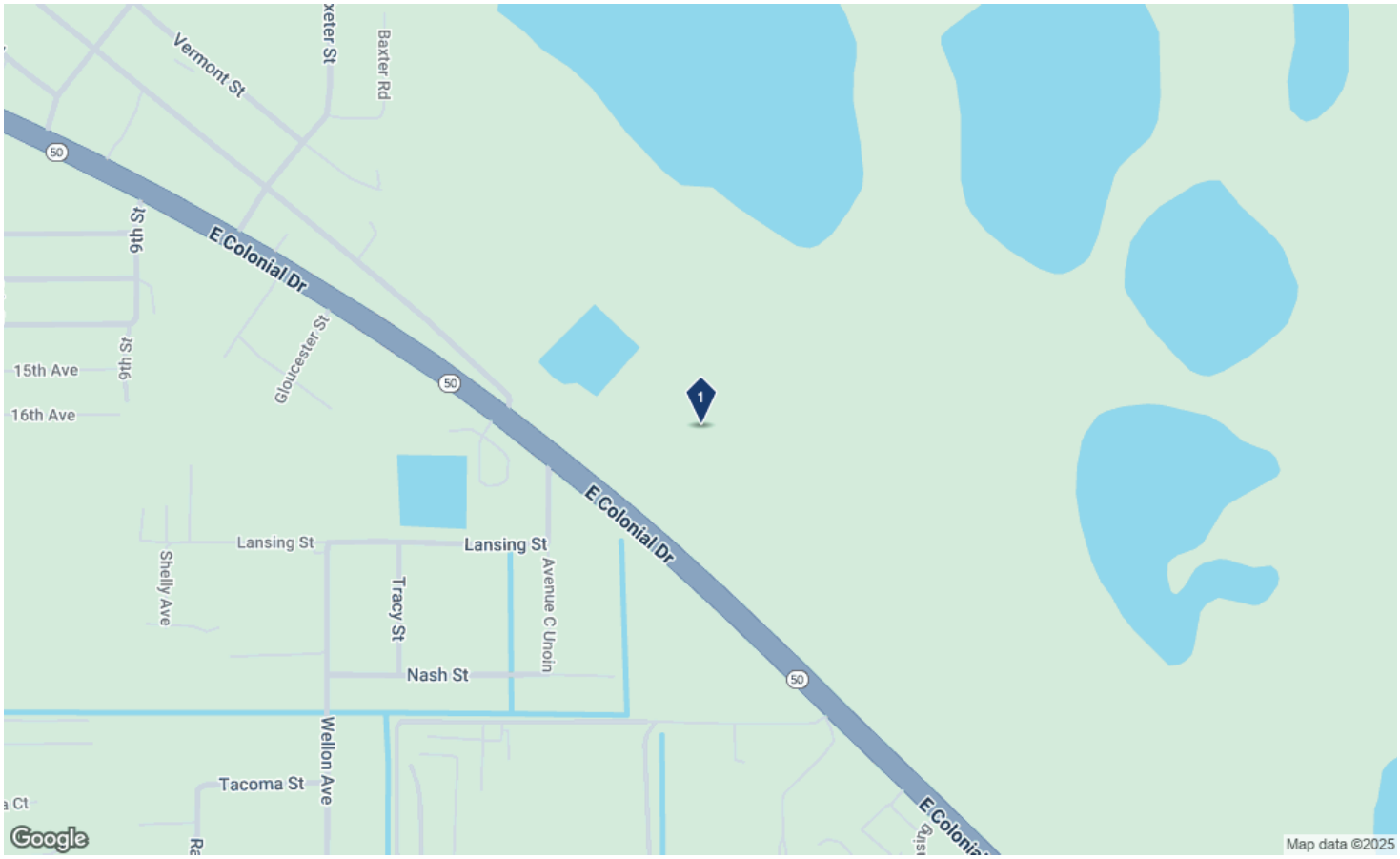
SALE NOTES

The Ranch is nestled between the Orlando metro and booming Space Coast of Florida with frontage on East State Road 50, with quick access to multiple International airports and quickly growing cities in the region. The property contains over 5 miles of water frontage on these deepwater lakes. The property contains roughly a mile of frontage & access on East State Road 50 East Colonial Drive which is 4-lanes, which is an arterial road for Central Florida, connecting the east to west coasts and running past UCF and DownTown Orlando. Honey Bee Ranch, as the crow flies, is roughly 6 miles to UCF & the Central Florida Research Park, and about 7 miles to Seminole State College. Also, it is minutes from multiple state-of-the-art regional hospitals and medical facilities. The Ranch has Publix anchored shopping centers 3± miles to the West accessed via State Road 50 (East Colonial Dr.) and significant retail centers a short drive away surrounding UCF, at Water for Lakes and in Oviedo.

For Sale Summary Report

For Sale: 19543 E Colonial Dr - 1,100+/- ac Waterfront Development Property i

Orlando, FL 32820 - SE Orange Outlying Submarket



LOCATION

Zip	32820
Submarket	SE Orange Outlying
Submarket Cluster	South Outlier
Market	Orlando
County	Orange
State	FL
CBSA	Orlando-Kissimmee-Sanford, FL
DMA	Orlando-Daytona Beach-Melbourne, FL

TRANSPORTATION

Airport	33 min drive to Orlando International
Walk Score®	Car-Dependent (14)

For Sale Summary Report

For Sale: 19543 E Colonial Dr - 1,100+/- ac Waterfront Development Property i

Orlando, FL 32820 - SE Orange Outlying Submarket

NEARBY SALE COMPARABLES

Address	Name	Rating	Yr Blt/Renov	Size	Sale Date	Sale Price	Price/AC
0 Central Florida Pkwy		★★★☆☆			Jan 2025	$5,500,000	$5,987

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For Sale Summary Report

For Sale: 1411 Osteen Maytown - River Bend Ranch Reserve 1170 acres Volusia

Osteen, FL 32764 - SE Volusia County Submarket

FOR SALE DETAILS

Price	$23,400,000
Price/SF	$0.46
Price/AC	$20,000
Time On Market	1 Month 12 Days
Last Updated	Apr 15, 2025
Status	Active
Sale Type	Investment

LAND

Land Acres	1,170.00 AC
Zoning	Agricultural
Parcels	9213-00-00-0020, 9213-00-00-0050, 9213-01-04-0130, 9214-00-00-0040,
Topography	Level
Proposed Use	Agricultural
Land SF	50,965,200 SF

SALES CONTACTS

Sales Company

Maury L. Carter & Associates, Inc.
Daryl Carter
3333 S Orange Ave, Suite 200
Orlando, FL 32806
United States
(407) 422-3144 (p)

SALE HIGHLIGHTS

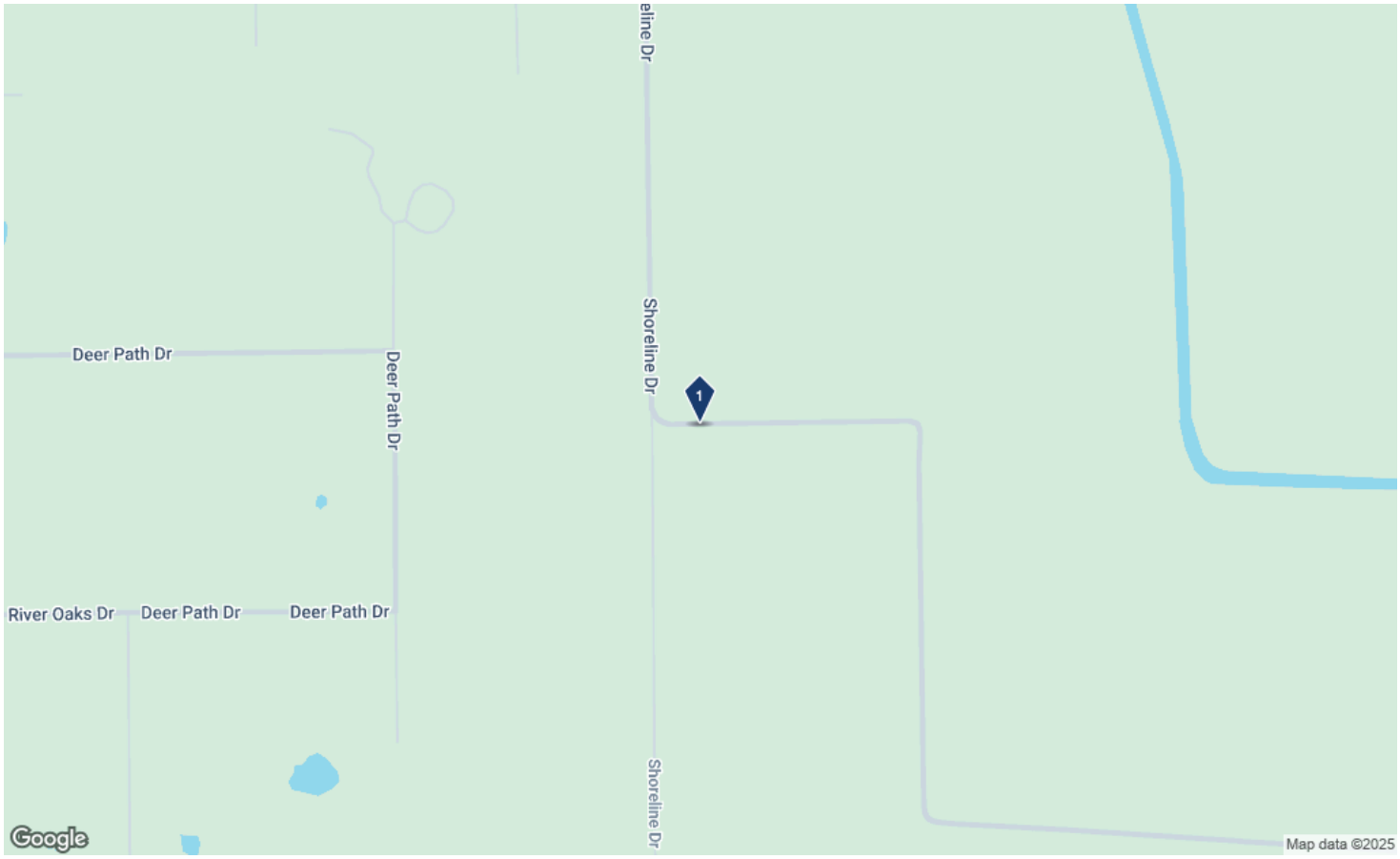
- 2+/- miles of frontage on the St. Johns River & 1.3+/- mile on Deep Creek
- 50 minute drive from Downtown Orlando
- 30 minute drive from Florida's Space Coast

2025 CoStar Group - Licensed to Miami-Dade County Internal Services Department - 1350713

For Sale Summary Report

For Sale: 1411 Osteen Maytown - River Bend Ranch Reserve 1170 acres Volusia

Osteen, FL 32764 - SE Volusia County Submarket



LOCATION

Zip	32764
Submarket	SE Volusia County
Submarket Cluster	SE Volusia County
Market	Deltona/Daytona Beach
County	Volusia
State	FL
CBSA	Deltona-Daytona Beach-Ormond Beach, FL
DMA	Orlando-Daytona Beach-Melbourne, FL

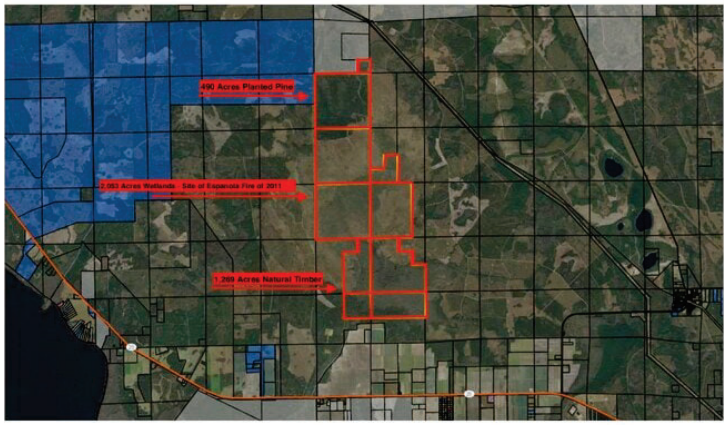
TRANSPORTATION

Airport	28 min drive to Orlando Sanford International

For Sale Summary Report

For Sale: Route 29 E - Peterson

Bunnell, FL 32110 - Daytona Area Submarket



FOR SALE DETAILS

Price	$4,575,000
Price/SF	$0.03
Price/AC	$1,200
Time On Market	4 Years 3 Months
Last Updated	Feb 1, 2021
Status	Active
Sale Type	Investment

LAND

Land Acres	3,812.00 AC
Zoning	AC
Parcels	18-13-29-0000-03030-0000
Topography	Level
Proposed Use	Agribusiness, Agricultural, Mixed Use, Timberland
On Sites	Raw land
Land SF	166,050,720 SF

SALES CONTACTS

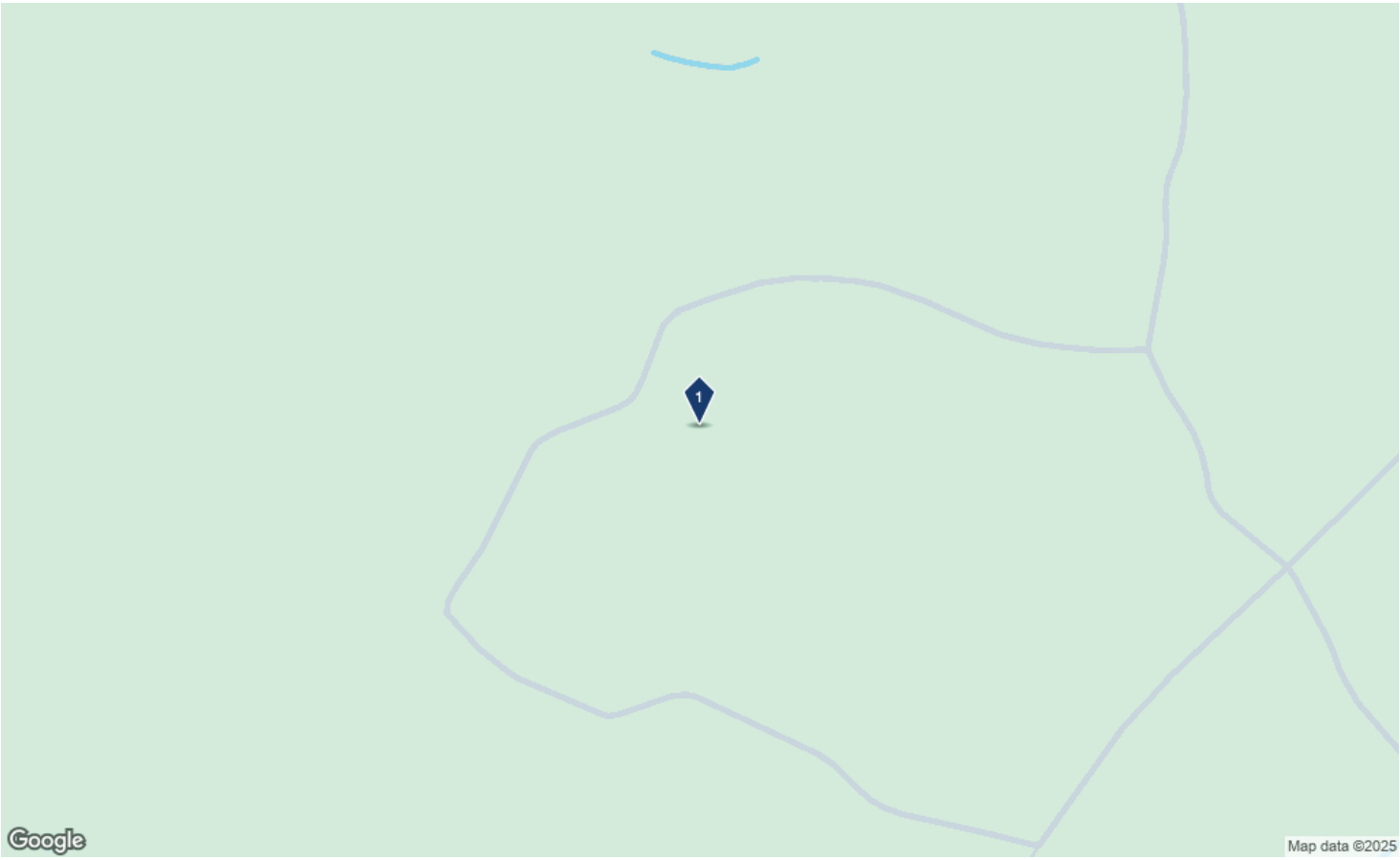
Sales Company	Southern Realty Megan Murphy 201 Owens Ave Saint Augustine, FL 32080 United States
Recorded Owner	Phillips Ranch Llc 3701 Olson Dr Daytona Beach, FL 32124 United States

2025 CoStar Group - Licensed to Miami-Dade County Internal Services Department - 1350713

For Sale Summary Report

For Sale: Route 29 E - Peterson

Bunnell, FL 32110 - Daytona Area Submarket



LOCATION	
Zip	32110
Submarket	Daytona Area
Submarket Cluster	Daytona Beach FL
Market	Other Market Areas
County	Flagler
State	FL
CBSA	Deltona-Daytona Beach-Ormond Beach, FL
DMA	Orlando-Daytona Beach-Melbourne, FL

For Sale Summary Report

For Sale: County Road 561 & South Shore of Lake Dora - Far Reach Ranch

Tavares, FL 32778 - Lake County Submarket

FOR SALE DETAILS

Price	Not Disclosed
Time On Market	1 Year 11 Months
Last Updated	May 9, 2025
Status	Active
Sale Type	Investment

LAND

Land Acres	1,389.00 AC
Parcels	03-20-26-0001-000-00200, 04-20-26-0001-000-00100,
Topography	Level
Proposed Use	Commercial, Mixed Use, Unknown
On Sites	Previously developed lot
Land SF	60,504,840 SF

SALES CONTACTS

Sales Company	Avison Young
	Michael Fay
AVISON YOUNG	2020 Ponce De Leon Blvd, Suite 1200
	Coral Gables, FL 33134
	United States
	(305) 446-0011 (p)
Sales Company	Avison Young
	David Duckworth
AVISON YOUNG	333 E Las Olas Blvd, Suite 200
	Fort Lauderdale, FL 33301
	United States
	(954) 903-1800 (p)

SALE HIGHLIGHTS

- Lakefront Location
- Large-Scale Mixed-Use Opportunity

For Sale Summary Report

For Sale: County Road 561 & South Shore of Lake Dora - Far Reach Ranch

Tavares, FL 32778 - Lake County Submarket

- Near the Best of Orlando
- In the Heart of Booming Florida

SALE NOTES

Avison Young is pleased to exclusively offer for sale the Far Reach Ranch, (the “Property”) – a ±1,389 acre lakefront mixed-use development opportunity located off of County Road 561 and the South Shore of Lake Dora in Tavares Florida, approximately 40 minutes northwest of Downtown Orlando and 45 minutes north of Disney World.

For Sale Summary Report

For Sale: County Road 561 & South Shore of Lake Dora - Far Reach Ranch

Tavares, FL 32778 - Lake County Submarket

LOCATION

Zip	32778
Submarket	Lake County
Submarket Cluster	Lake County
Market	Orlando
County	Lake
State	FL
CBSA	Orlando-Kissimmee-Sanford, FL
DMA	Orlando-Daytona Beach-Melbourne, FL

TRANSPORTATION

Airport	57 min drive to Orlando Sanford International

For Sale Summary Report

For Sale: US Highway 27 - US Highway 27

Groveland, FL 34736 - Lake County Submarket

FOR SALE DETAILS

Price	Not Disclosed
Time On Market	4 Years 9 Months
Last Updated	Apr 14, 2025
Status	Active
Sale Type	Investment

LAND

Land Acres	2,474.00 AC
Zoning	PUD
Parcels	12-22-24-0003-000-00800, 13-21-24-0004-000-00600,
Topography	Level
Proposed Use	Commercial, Distribution, Hold for Development, Industrial, Industrial
On Sites	Raw land
Land SF	107,767,440 SF

SALES CONTACTS

Sales Company

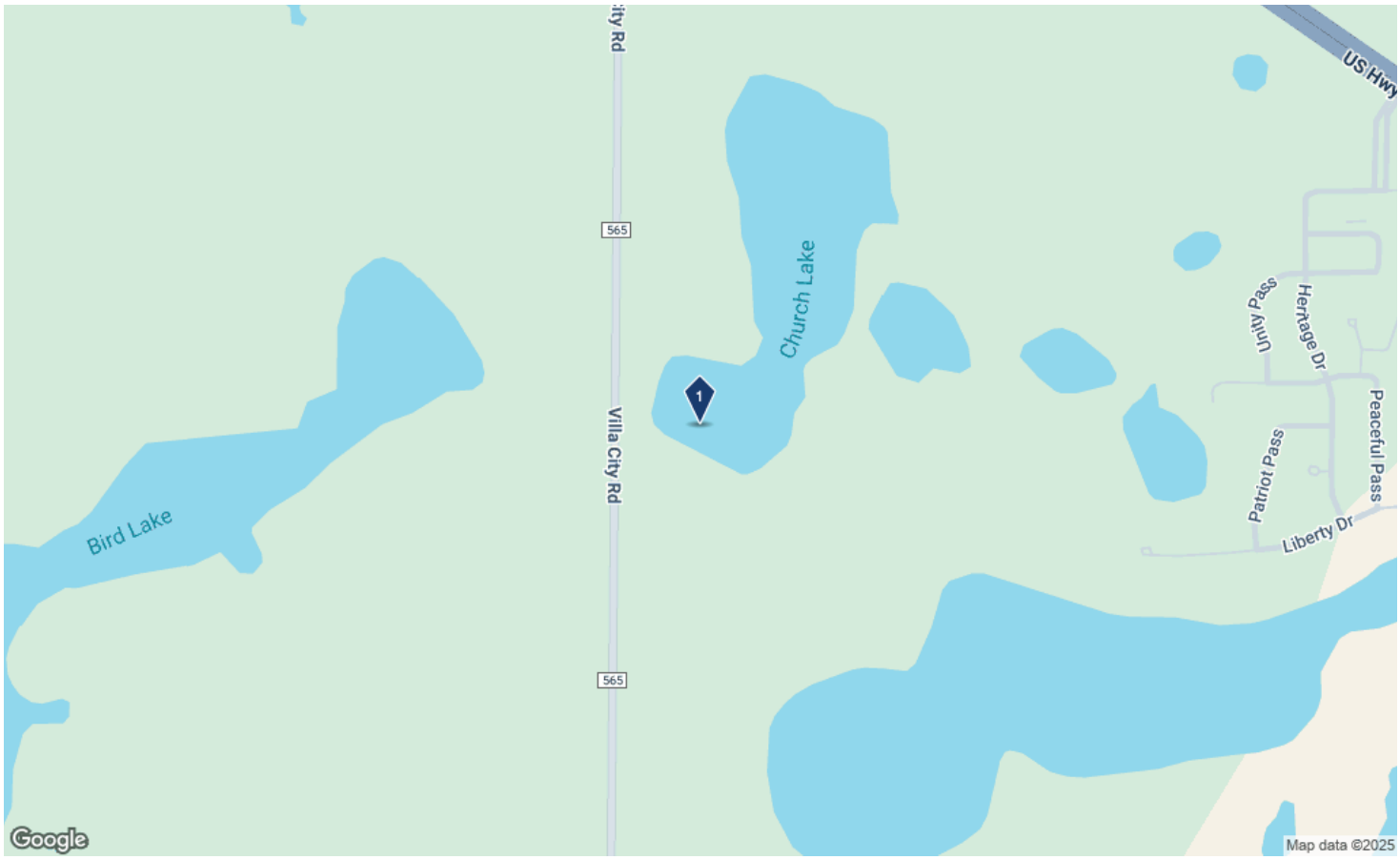
CBRE

CBRE
Robbie McEwan
200 S Orange Ave, Suite 2100
Orlando, FL 32801
United States
(407) 404-5000 (p)

For Sale Summary Report

For Sale: US Highway 27 - US Highway 27

Groveland, FL 34736 - Lake County Submarket

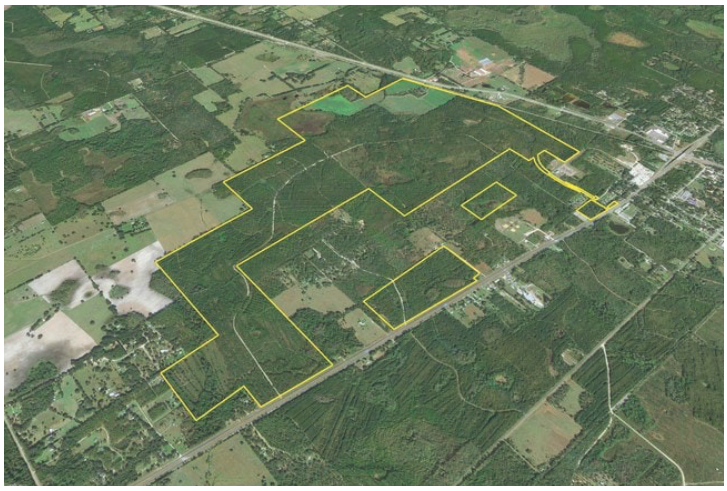


LOCATION	
Zip	34736
Submarket	Lake County
Submarket Cluster	Lake County
Market	Orlando
County	Lake
State	FL
CBSA	Orlando-Kissimmee-Sanford, FL
DMA	Orlando-Daytona Beach-Melbourne, FL

For Sale Summary Report

For Sale: 19601 SE Hawthorne Rd - Hawthorne Industry Park

Hawthorne, FL 32640 - Gainesville Submarket



FOR SALE DETAILS

Price	Not Disclosed
Time On Market	6 Years 1 Month
Last Updated	May 5, 2025
Status	Active
Sale Type	Investment or Owner User

LAND

Land Acres	1,068.00 AC
Zoning	MU
Parcels	19839-001-000
Topography	Level
Proposed Use	Commercial, Industrial, Mixed Use
Opportunity Zone	Yes
Off Sites	Cable, No Curb/Gutter/Sidewalk, Electricity, Gas, No Irrigation, Sewer,
On Sites	Raw land
Approvals	Approved Plan
Land SF	46,522,080 SF

For Sale Summary Report

For Sale: 19601 SE Hawthorne Rd - Hawthorne Industry Park

Hawthorne, FL 32640 - Gainesville Submarket

SALES CONTACTS

Sales Company	Cushman & Wakefield Michael Flynn 1290 Avenue of the Americas New York, NY 10104 United States (212) 841-7500 (p)
Sales Company	Cushman & Wakefield of Florida, Inc. Jared Bonshire 20 N Orange Ave, Suite 300 Orlando, FL 32801 United States (407) 841-8000 (p)
Sales Company	Cushman & Wakefield of Florida, LLC Tyler Newman 121 W Forsyth St, Suite 900 Jacksonville, FL 32202 United States (904) 731-9500 (p)
Sales Company	Cushman & Wakefield | Thalhimer William Throne 222 Central Park Ave, Suite 1500 Virginia Beach, VA 23462 United States (757) 499-2900 (p)

Recorded Owner	Weyerhaeuser Company 200 Occidental Ave, Suite 220 Seattle, WA 98104 United States (800) 525-5440 (p)
True Owner	Weyerhaeuser Company 200 Occidental Ave, Suite 220 Seattle, WA 98104 United States (800) 525-5440 (p)

SALE HIGHLIGHTS

- 1,068 acre, rail served development site, with 634 shovel-ready acres, is approved for 3.5 million square feet for industrial development.
- Located in Hawthorne, Florida in Alachua County, bordered by U.S. 301 and S.R. 20, connecting to Interstates 75 and 10.
- A workforce of 300,000 lives within 60 miles or average of one hour of the site.

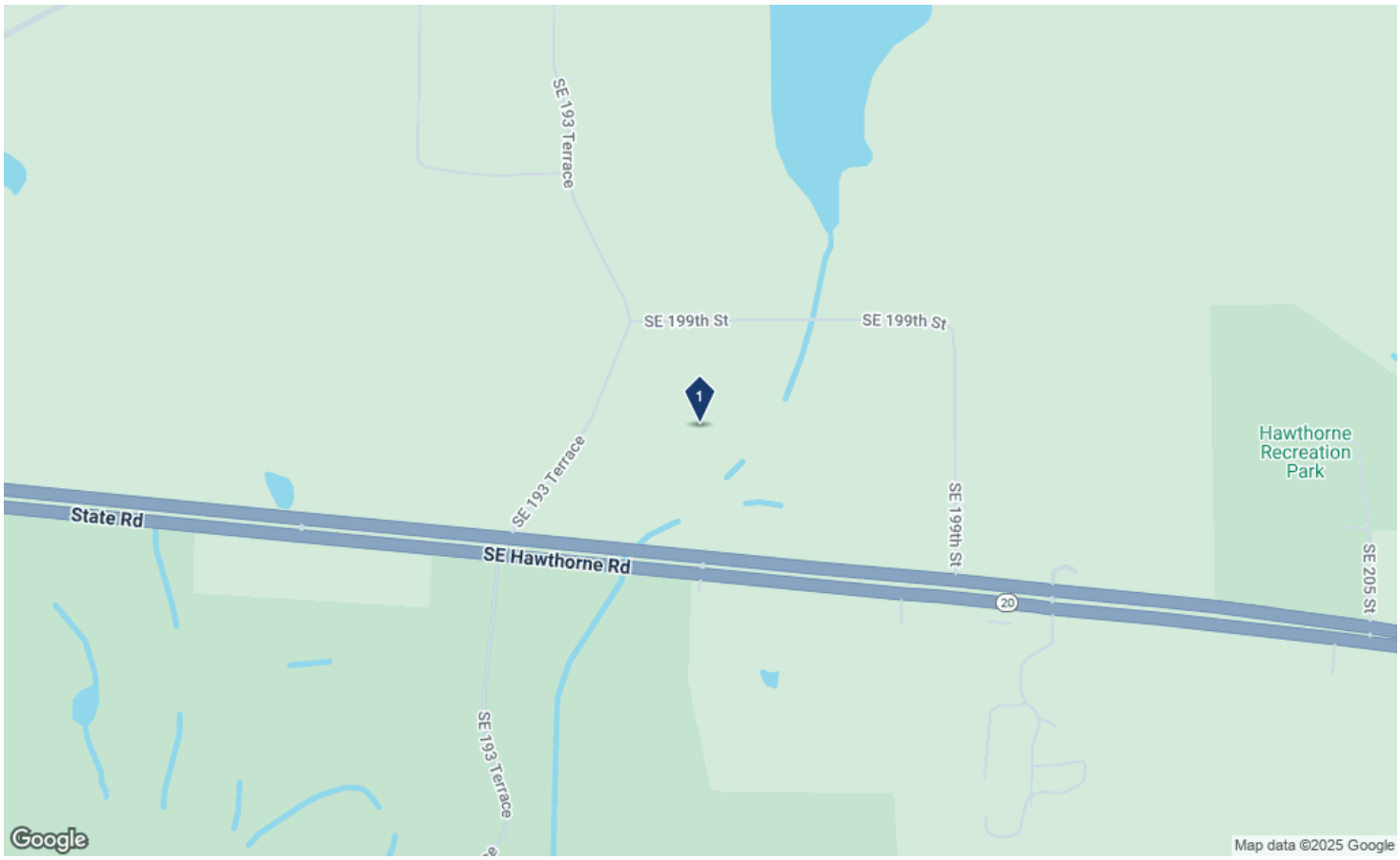
SALE NOTES

- Shovel-Ready site located in Alachua County, bordered by U.S. 301 and S.R. 20, convenient to Interstates 75 and 10
- The 1,068 acre, CSX rail served site, includes 634 shovel-ready acres, approved for 3.5 million square feet of industrial, manufacturing and logistics development, plus 150,000 square feet of commercial/retail.
- All utilities are currently at the site: electric (distribution, transmission), water, sewer, natural gas and telecommunications.
- A workforce of 300,000 lives within 60 miles or average of one hour of the site.
- Just 16 miles from the City of Gainesville, University of Florida (#8 Public University by U.S. News and World Report) and Santa Fe College (#1 Two-Year College by The Aspen Institute).
- Eligible companies can take advantage of incentives such as Tax Abatement, New Market Tax Credits, Qualified Target Industry Tax Refund, Quick Response Training, Sales and Use Tax Exemptions, Local Discretionary Incentives, Workforce Programs and State Funding, State of Florida - Jobs Growth Fund for Workforce Training, Business Incentives, U.S. Opportunity Zone.

For Sale Summary Report

For Sale: 19601 SE Hawthorne Rd - Hawthorne Industry Park

Hawthorne, FL 32640 - Gainesville Submarket



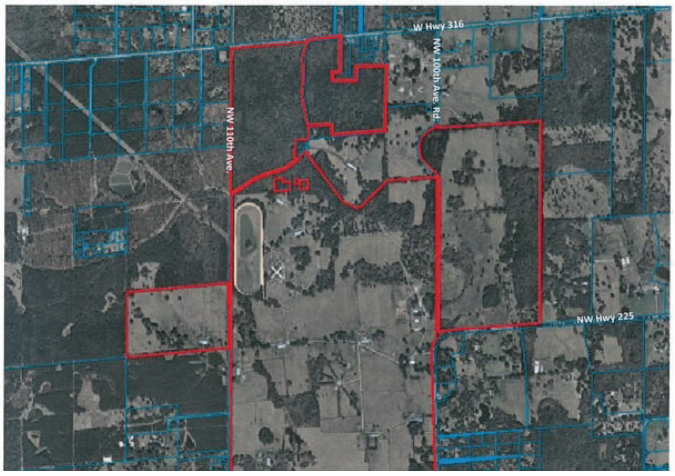
LOCATION	
Zip	32640
Submarket	Gainesville
Submarket Cluster	Florida Central North
Market	Other Market Areas
County	Alachua
State	FL
CBSA	Gainesville, FL
DMA	Gainesville, FL

TRANSPORTATION	
Airport	29 min drive to Gainesville Regional
Walk Score®	Car-Dependent (2)

For Sale Summary Report

For Sale: NW 110th Ave - Lambholm South

Reddick, FL 32686 - Outlying Marion County Submarket



FOR SALE DETAILS

Price	$27,500,000
Price/SF	$0.38
Price/AC	$16,586
Time On Market	6 Years 8 Months
Last Updated	Apr 29, 2025
Status	Active
Sale Type	Investment

LAND

Land Acres	1,658.00 AC
Zoning	A-1
Parcels	05870-003-00, 05870-004-00, 05870-005-00
Topography	Rolling
Off Sites	No Cable, No Curb/Gutter/Sidewalk, Electricity, No Gas, No Irrigation,
On Sites	Raw land
Land SF	72,222,480 SF

SALES CONTACTS

Sales Company

INTERNATIONAL PROPERTY SERVICES, CORP.

International Property Services, Corp.
Todd Rudnianyn
2441 NE 3rd St, Suite 201
Ocala, FL 34470
United States
(352) 629-6101 (p)

Recorded Owner

Equity Trust Company
1212 NE 1st St
Ocala, FL 34470
United States

SALE HIGHLIGHTS

- Paved frontage
- Located in the heart of horse country
- Mediterranean Style home overlooks one mile track
- Minutes from two major interchanges
- Short drive to Ocala or Gainesville

For Sale Summary Report

For Sale: NW 110th Ave - Lambholm South

Reddick, FL 32686 - Outlying Marion County Submarket

SALE NOTES

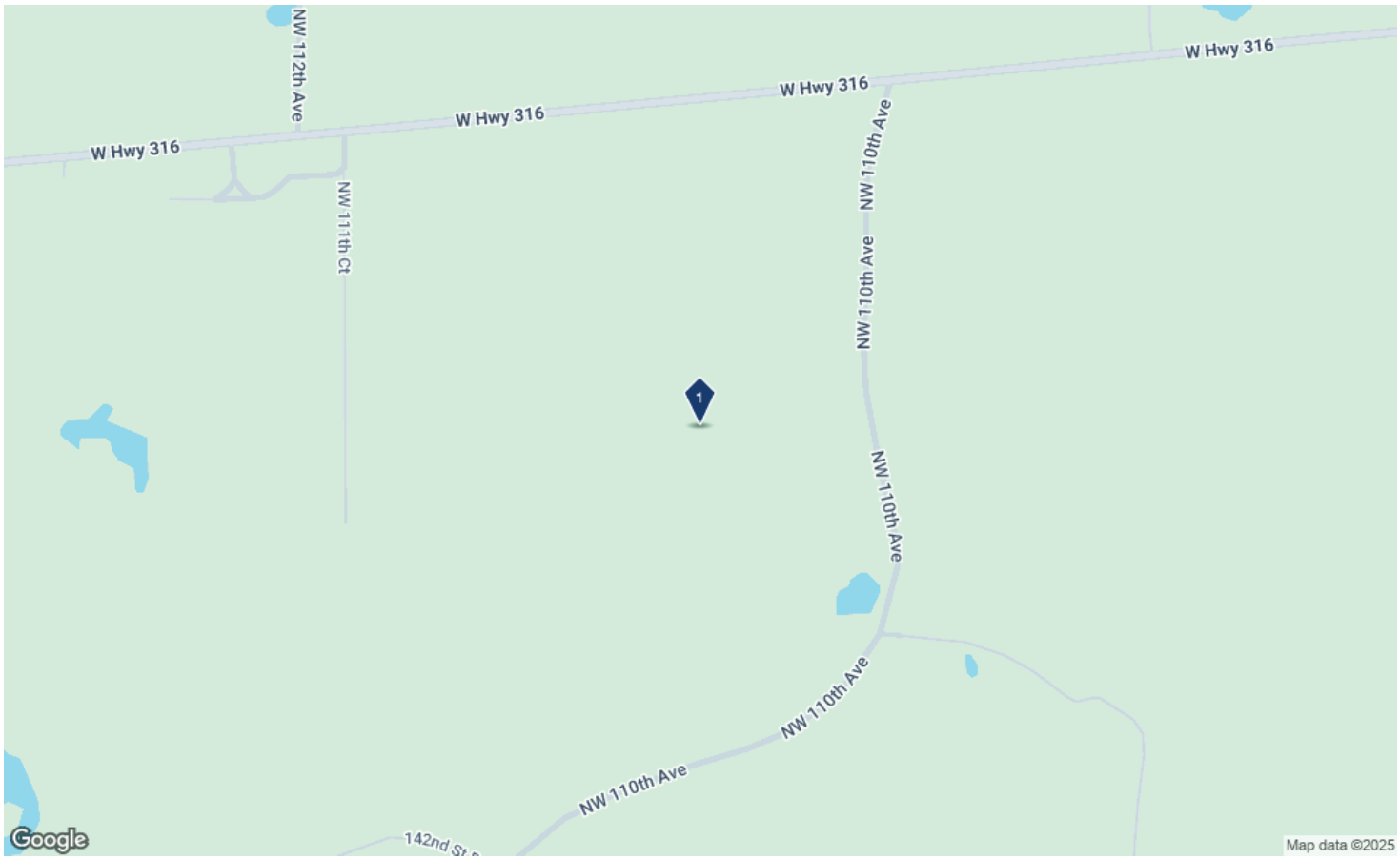
$16,586 Per Acre
Owner will divide.
VIEW BROCHURE FOR MORE INFORMATION!

The information contained herein is deemed reliable but is not guaranteed. Buyer should make their own investigation regarding this property. Real estate associate/broker are affiliated with ownership. Commission only paid upon successful closing.

For Sale Summary Report

For Sale: NW 110th Ave - Lambholm South

Reddick, FL 32686 - Outlying Marion County Submarket



LOCATION	
Zip	32686
Submarket	Outlying Marion County
Submarket Cluster	Outlying Marion County
Market	Ocala
County	Marion
State	FL
CBSA	Ocala, FL
DMA	Orlando-Daytona Beach-Melbourne, FL

TRANSPORTATION	
Airport	53 min drive to Gainesville Regional

For Sale Summary Report

For Sale: 4901 Oren Brown Rd - Poinciana Blvd Residential Development Tract

Kissimmee, FL 34746 - Osceola Outlying Submarket

FOR SALE DETAILS

Price	Not Disclosed
Time On Market	2 Years 4 Months
Last Updated	May 14, 2025
Status	Active
Sale Type	Investment

LAND

Land Acres	1,720.00 AC
Zoning	OAC
Parcels	14-25-28-0000-0020-0000
Topography	Level
Current Use	Vacant land
Proposed Use	Commercial, MultiFamily, Single Family Development
On Sites	Raw land
Land SF	74,923,200 SF

SALES CONTACTS

Sales Company

SAUNDERS COMMERCIAL

Saunders Real Estate
Dean Saunders
1723 Bartow Rd
Lakeland, FL 33801
United States
(863) 648-1528 (p)

Recorded Owner

Brown Ranch Six Llc
4998 Oren Brown Rd
Kissimmee, FL 34746
United States

SALE HIGHLIGHTS

- Legacy property in the Central Florida Tourism Corridor
- Premier, large acreage tract features 1.5 ± miles of road frontage along Poinciana Boulevard
- 1,708 acres are zoned Low-Density Residential allowing for 3 to 8 dwelling units per acre
- Located 5 miles from the ESPN Wide World of Sports Complex, 15 minutes to Walt Disney World® Resort

For Sale Summary Report

For Sale: 4901 Oren Brown Rd - Poinciana Blvd Residential Development Tract

Kissimmee, FL 34746 - Osceola Outlying Submarket

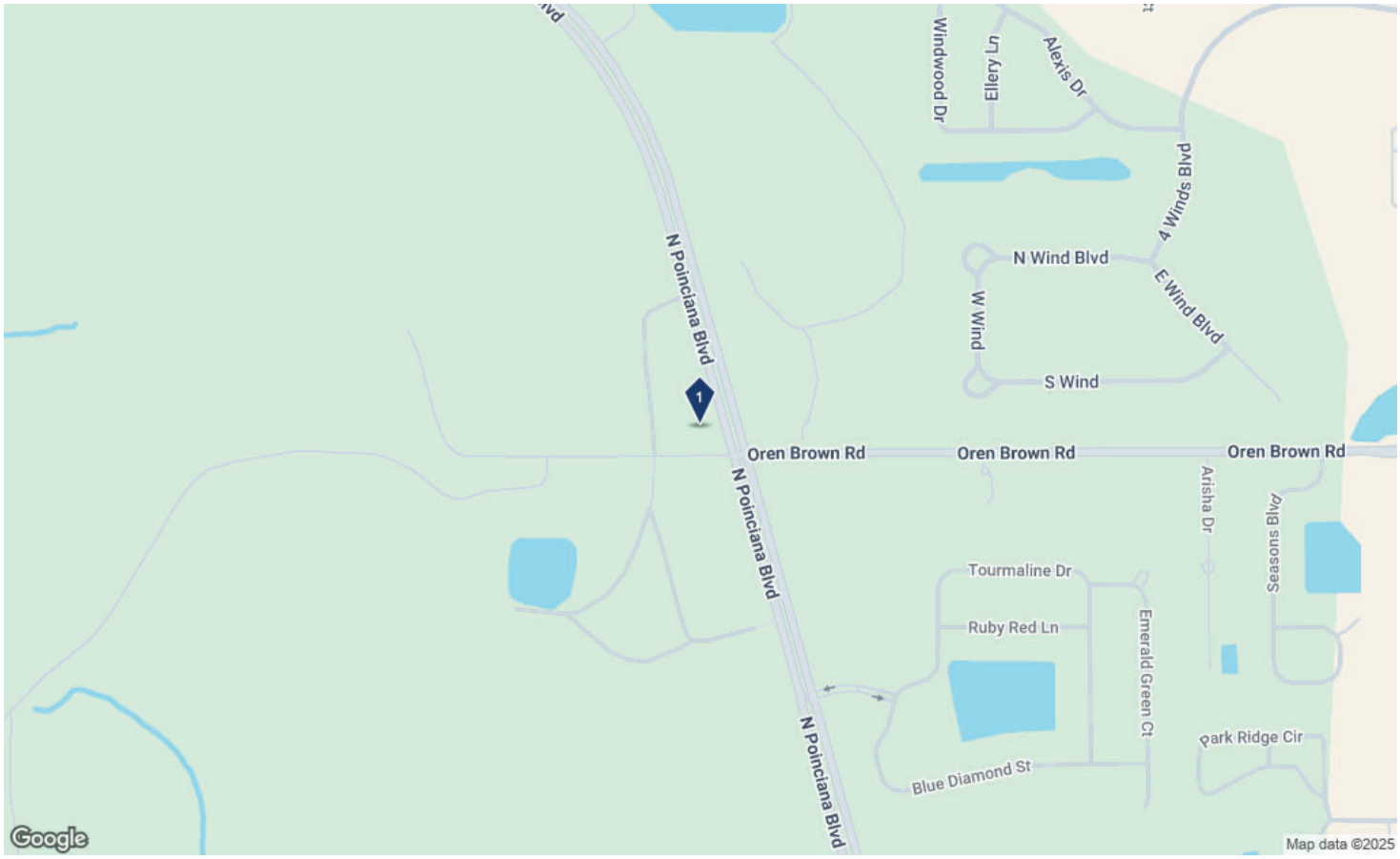
SALE NOTES

The addition of a single-family residential neighborhood miles away from world-class attractions only increases the value of this Legacy property. The remaining 12 acres have future land use dedicated for Commercial Tourism. This acreage has the potential to change through a zoning request to the county.

For Sale Summary Report

For Sale: 4901 Oren Brown Rd - Poinciana Blvd Residential Development Tract

Kissimmee, FL 34746 - Osceola Outlying Submarket



LOCATION

Zip	34746
Submarket	Osceola Outlying
Submarket Cluster	South Outlier
Market	Orlando
County	Osceola
State	FL
CBSA	Orlando-Kissimmee-Sanford, FL
DMA	Orlando-Daytona Beach-Melbourne, FL

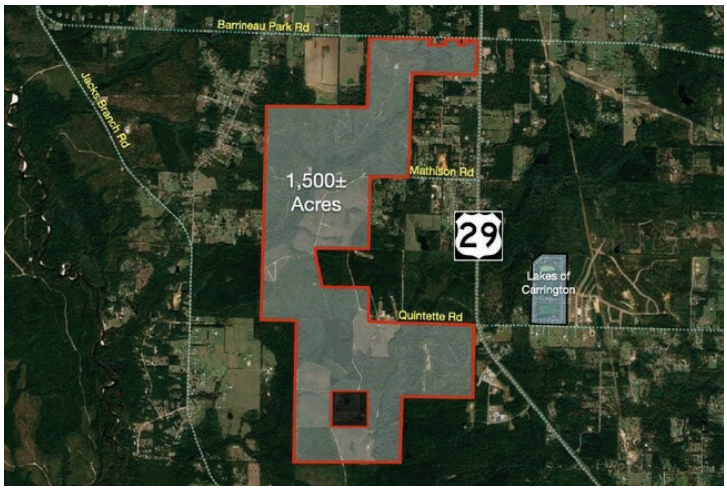
TRANSPORTATION

Commuter Rail	5 min drive to Poinciana (SunRail - Florida Department of Transporta-
Airport	31 min drive to Orlando International
Walk Score®	Car-Dependent (3)

For Sale Summary Report

For Sale: 2601 Highway 29

Cantonment, FL 32533 - Upper Escambia County Submarket



FOR SALE DETAILS

Price	Not Disclosed
Time On Market	1 Year 6 Months
Last Updated	May 8, 2025
Status	Active
Sale Type	Investment

LAND

Land Acres	1,500.00 AC
Zoning	COM,HDR,MD
Parcels	29-2N-31-3100-000-000
Land SF	65,340,000 SF

SALES CONTACTS

Sales Company

Eshenbaugh Land Company
William Eshenbaugh
304 S Willow Ave
Tampa, FL 33606
United States
(813) 287-8787 (p)

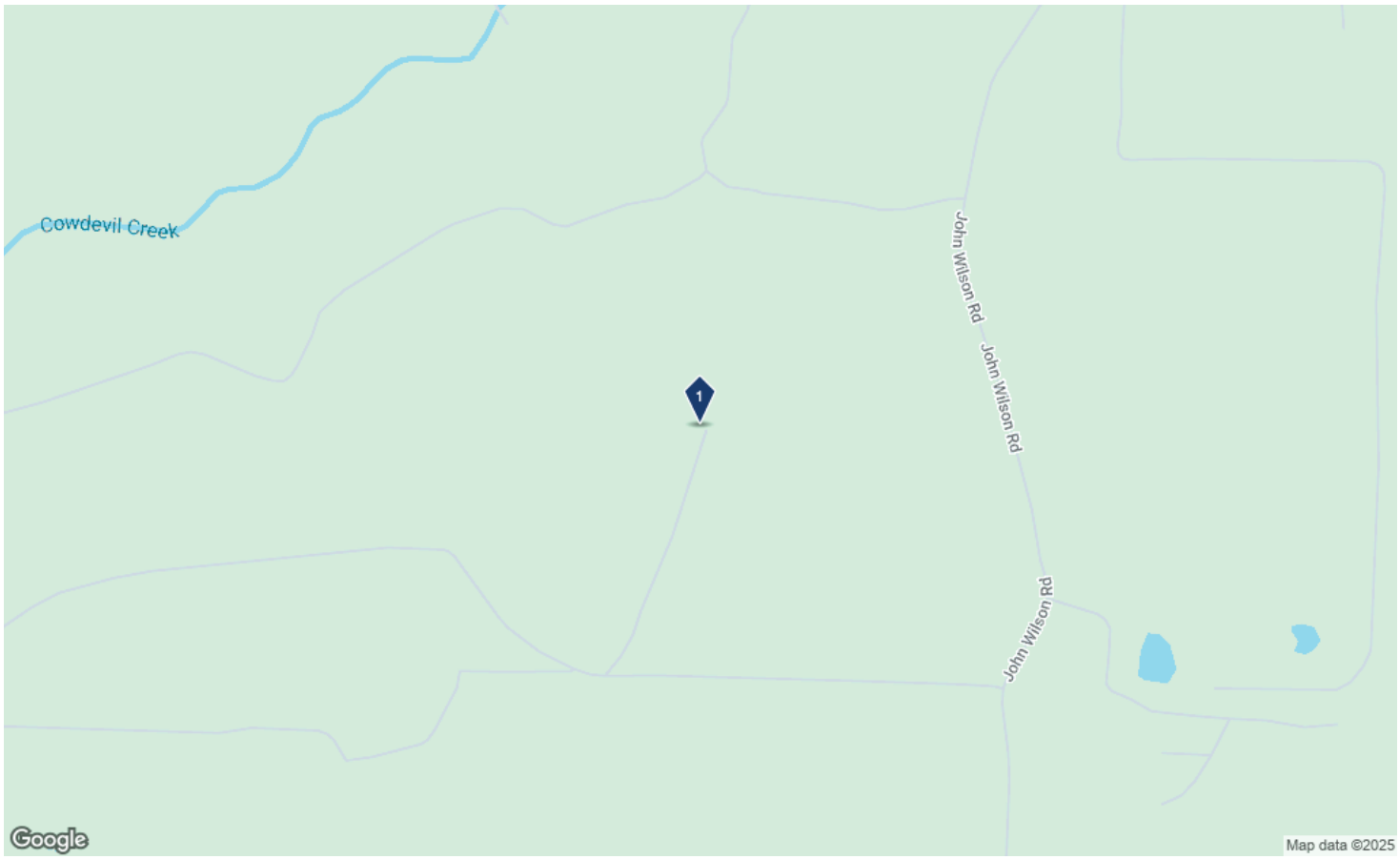
Recorded Owner

Exit 3 Investments Llc
695 31st St S
Saint Petersburg, FL 33712
United States

For Sale Summary Report

For Sale: 2601 Highway 29

Cantonment, FL 32533 - Upper Escambia County Submarket



LOCATION

Zip	32533
Submarket	Upper Escambia County
Submarket Cluster	Upper Escambia County
Market	Pensacola
County	Escambia
State	FL
CBSA	Pensacola-Ferry Pass-Brent, FL
DMA	Mobile-Pensacola-Ft Walton Beach, AL-FL-MS

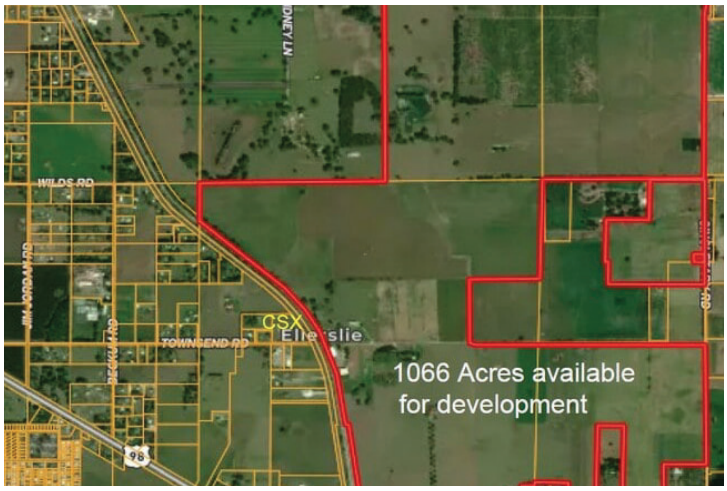
TRANSPORTATION

Airport	39 min drive to Pensacola International

For Sale Summary Report

For Sale: 40600 Enterprise Rd - Enterprise Super Site Pasco 1066

Dade City, FL 33525 - Pasco County Submarket



FOR SALE DETAILS

Price	Not Disclosed
Time On Market	2 Years 11 Months
Last Updated	Apr 23, 2025
Status	Active
Sale Type	Investment
Conditions	Build to Suit, Bulk/Portfolio Sale

LAND

Land Acres	1,066.00 AC
Zoning	AC
Parcels	07-25-22-0000-00100-0010, 07-25-22-0000-00100-0030,
Topography	Rolling
Proposed Use	Industrial, Industrial Park, Warehouse
Off Sites	Cable, No Curb/Gutter/Sidewalk, Electricity, No Gas, Irrigation, Sewer,
On Sites	Raw land
Approvals	Engineering, Maps
Land SF	46,434,960 SF

SALES CONTACTS

Sales Company	St Petersburg Distillery Steve Iafrate 855 S 28th St Saint Petersburg, FL 33712 United States (727) 486-2338 (p)
Recorded Owner	Angelo's Florida Properties, LLC 855 28th St S Saint Petersburg, FL 33712 United States (727) 902-0144 (p)

SALE HIGHLIGHTS

- Dry buildable land which is close to Tampa I-4, I-75, I-275, Port Tampa Bay and TPA international airport
- Access to Dual Power.

SALE NOTES

2025 CoStar Group - Licensed to Miami-Dade County Internal Services Department - 1350713

For Sale Summary Report

For Sale: 40600 Enterprise Rd - Enterprise Super Site Pasco 1066

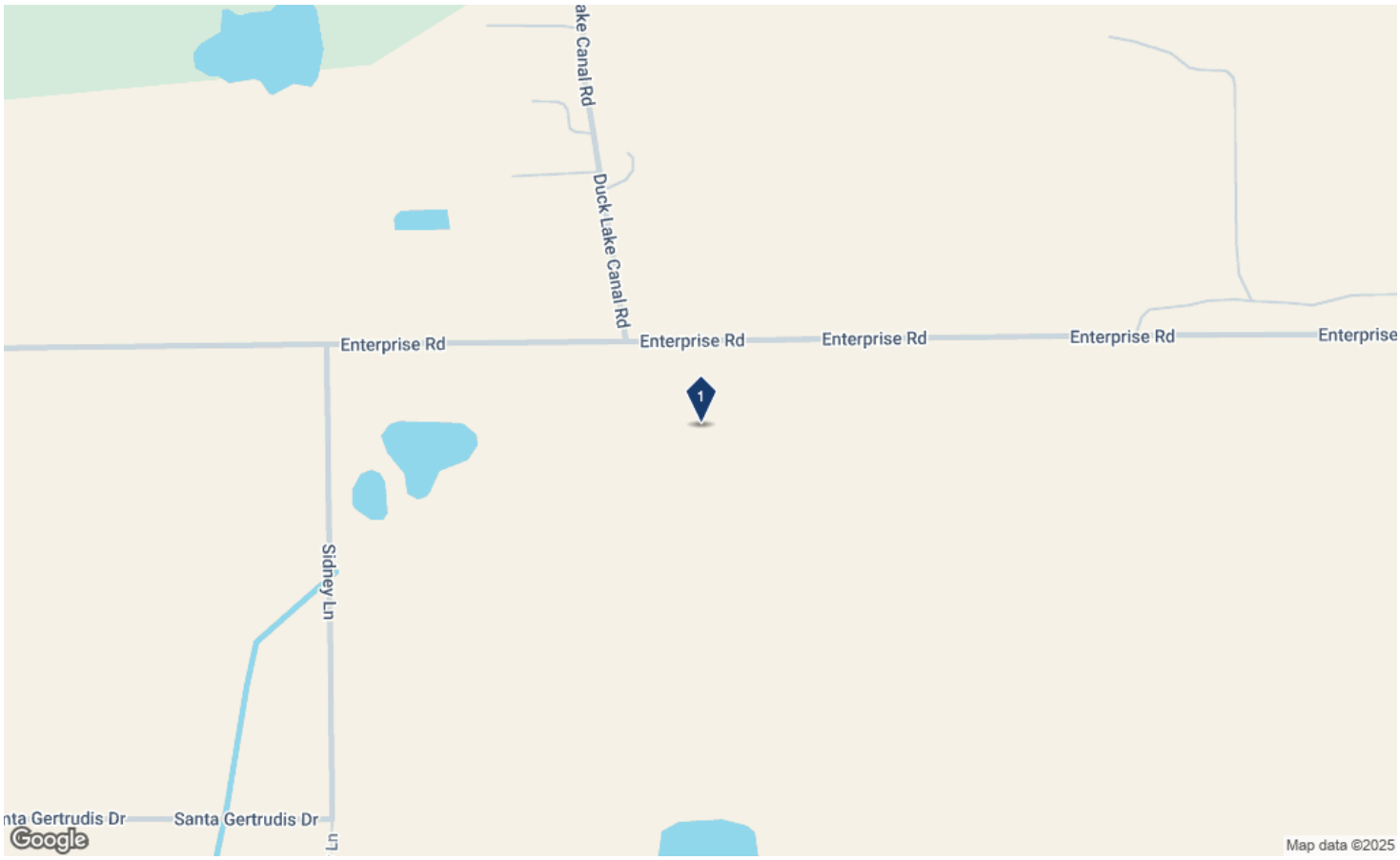
Dade City, FL 33525 - Pasco County Submarket

A great industrial site with dry land.

For Sale Summary Report

For Sale: 40600 Enterprise Rd - Enterprise Super Site Pasco 1066

Dade City, FL 33525 - Pasco County Submarket



LOCATION	
Zip	33525
Submarket	Pasco County
Submarket Cluster	Pasco County
Market	Tampa/St Petersburg
County	Pasco
State	FL
CBSA	Tampa-St. Petersburg-Clearwater, FL
DMA	Tampa-St Petersburg (Sarasota), FL

Exhibit 5.3

Out-of-County Landfills Property Search Results

EXHIBIT 5.3

Out-of-County Landfills

Site No.	Street Address	City	Zip	County	Acreage	Price	Zoning	Infrastucture	Terrain	Current Use	Proposed Use	Topography	Proximity to Railway
1	11500 Warfield Blvd	Indiantown	34956	Martin	1,512.00	Not Disclosed	AG20	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, No Irrigation	N/A	N/A	HUNTING AND SHOOTING	N/A	FEC 24.8m
2	SW Discovery Way & Village Parkway Way	Port Saint Lucie	34953	St Lucie	1,186.93	Not Disclosed	Commercial	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, No Irrigation	Rough graded	Vacant	Apartment Units, Commercial, Industrial, multi-family residential, recreational, entertainment	Level	FEC 17.2m
3	5304 Okeechobee Rd	Fort Pierce	34947	St Lucie	14,000.00	$255,000	Commercial	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, No Irrigation	N/A	N/A	Commercial	N/A	FEC 4.2m
4	3893 NW 50th Drive	Okeechobee	34972	Okeechobee	2,278.00	Not Disclosed	Agricultural	N/A	Raw Land	N/A	Agricultural	Rolling	FEC 46.3m
5	23351 N River Rd	Alva	33920	Lee	1,900.00	$4,000,000 - 11,200,000	Agricultural	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, No Irrigation	Raw Land	Vacant	Agribusiness, Agricultural, Hold for Investment, Pasture/ Ranch	Level	FEC 129m
6	6220 Holopaw	Saint Cloud	34773	Osceola	5,060.00	Not Disclosed	AC	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, No Irrigation	Raw Land	Vacant	Agribusiness, Agricultural, Golf Course/ Driving Range, Single Family	Level	FEC 81.8m
7	19543 E Colonial Dr	Orlando	32820	Orange	1,100.00	Not Disclosed	PD, A-2	N/A	Raw Land	Vacant	Commercial, Master Planned Community, Planned Unit Development	Rolling	FEC 21.8M; CSX 27.2m (West)
8	1411 Osteen Maytown	Osteen	32764	Volusia	1,170.00	$23,400,000	Agricultural	N/A	N/A	N/A	Agricultural	Level	FEC 132m: CSX 15.1m (West)
9	Route 29 E	Bunnell	32110	Flagler	3,812.00	$4,575,000	AC	N/A	Raw Land	N/A	Agribusiness, Agricultural, Mixed Use, Timberland	Level	FEC 42.7M
10	County Road 561 & South Shore of Lake Dora	Tavares	32778	Lake	1,389.00	Not Disclosed	N/A	N/A	Previously Developed Lot	N/A	Commercial, Mixed Use, Unknown	Level	FEC 137m
11	US Highway 27	Groveland	34736	Lake	2,474.00	Not Disclosed	PUD	N/A	Raw Land	N/A	Commercial, Distribution, Hold for Development. Industrial	Level	FEC 140m; CSX 28.1m (North)
12	19601 SE Hawthorne Rd	Hawthorne	32640	Alachua	1,068.00	Not Disclosed	MU	Cable, No Curb/Gutter/Sidewalk, Electricity, Gas, No Irrigation, Sewer	Raw Land	N/A	Commercial, Industrial, Mixed Use	Level	CSX 61.6m (South); FEC 80.5m (NE)
13	NW 110th Ave	Reddick	32686	Marion	1,658.00	$27,500,000	A-1	No Cable, No Curb/Gutter/Sidewalk, No Electricity, No Gas, No Irrigation	Raw Land	N/A	N/A	Rolling	CSX 43.1m (South)
14	4901 Oren Brown Rd	Kissimmee	34746	Osceola	1,720.00	Not Disclosed	OAC	N/A	Raw Land	Vacant	Commercial, MultiFamily, Single Family Development	Level	FEC 106 m (SE); CSX 40.4m (SW)
15	2601 Highway 29	Cantonment	32533	Escambia	1,500.00	Not Disclosed	COM,HDR,MD	N/A	N/A	N/A	N/A	N/A	FEC 371m
16	40600 Enterprise Rd	Dade City	33525	Pasco	1,066.00	Not Disclosed	AC	Cable, No Curb/Gutter/Sidewalk, Electricity, No Gas, Irrigation, Sewer	Raw Land	N/A	N/A	Rolling	CSX 21.0m

ATTACHMENT 6

Directive 250227: Report on the County's Engagement with Broward County and Palm Beach County to Find Solutions to Solid Waste Management Problems

Memorandum

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on the County's Engagement with Broward County and Palm Beach County to Find Solutions to Solid Waste Management Problems – Directive No. 250227

Executive Summary

On February 19, 2025, the Board of County Commissioners ("Board") approved Resolution No. R-186-25 ("Resolution"), sponsored by Commissioner Juan Carlos Bermudez, directing the County Mayor or the County Mayor's designee to continue to engage with Broward County and Palm Beach County to find solutions to solid waste management problems and provide a report detailing such discussions, engagements, and proposed solutions and recommendations.

We are actively engaged in ongoing discussions with our neighbors in Broward and Palm Beach counties to explore collaborative solutions for solid waste disposal. These conversations include the potential for a unified regional approach and possible joint ventures if new waste management facilities are approved in any of our counties. We remain committed to working closely with regional partners to address shared challenges and identify sustainable, long-term solutions that benefit all communities involved. In particular, we have had active and productive communications with Broward County, and they have expressed openness to potential joint venture opportunities.

Background

A Regional Solid Waste Management meeting was held on Tuesday, April 15, 2025, at the South Florida Regional Planning Council office in Hollywood, Florida. The meeting brought together senior leadership and planning officials from Miami-Dade, Broward, and Palm Beach Counties, as well as representatives from the South Florida and Treasure Coast Regional Planning Councils. The purpose was to support regional dialogue and coordination in response to ongoing concerns surrounding waste disposal, recycling, infrastructure, and long-term sustainability.

Regional Updates and Observations

Miami-Dade County

- The County continues to experience growing pressure on its solid waste infrastructure due to population increases, tourism expansion, and limited landfill capacity.
- The County's Waste-to-Energy (WTE) facility fire in February 2023 removed a critical disposal resource, previously managing approximately 2 million tons annually. The incident has intensified the urgency to diversify disposal strategies.
- The County is operating two landfills: a Class I and Class III facility, both nearing their projected capacity within the next few years.
- Waste-by-rail services have played a significant role in temporarily alleviating disposal burdens and offer a model for logistical relief.
- Miami-Dade is pursuing new waste management solutions, including the potential for composting and expansion of organics programs. Proposed policy changes will be addressed by the Board in July 2025.

- The County has observed strong performance from its mulch program that started in September 2024.
- The new recycling contract introduced the use of AI-enabled cameras for real-time recycling enforcement through our partner contracts.

Broward County

- Broward County's waste infrastructure, like Miami-Dade's, faces capacity challenges due to population growth and aging facilities.
- A notable success has been the development of the Broward Solid Waste Authority (BSWA) through an Interlocal Agreement with municipal partners. The BSWA is currently leading the development of a comprehensive Solid Waste Master Plan to be finalized in the Summer of 2025.
- The plan will present long-term disposal options, strategies for regional cooperation, and educational outreach for residents.
- Broward processes approximately 4.9 million tons of waste annually through a WTE plant that has operated for over three decades.
- Space limitations prevent the County from establishing new composting infrastructure. Additionally, community concerns about potential odor issues have been identified as significant barriers.
- The County emphasized the importance of consistent public education regarding the benefits, limitations, and trade-offs of various disposal technologies.

Palm Beach County

- The Solid Waste Authority of Palm Beach County (SWA) manages roughly 5,000 tons of solid waste daily.
- The County's advanced waste infrastructure includes both a modern renewable energy facility and an older facility approaching its 30-year lifecycle. Planning is underway for a new plant scheduled to open in 2034.
- Palm Beach leads the state in recycling performance and has maintained the top recycling rate for two consecutive years. This success is attributed to the County's zero-landfill strategy, a dual-stream recycling system, continuous outreach efforts, and effective use of its WTE facility.
- In terms of composting, Palm Beach SWA reported that vegetative waste volumes are substantially higher than food waste. While food waste measures around 20,000 tons, vegetative waste totals hundreds of thousands of tons.
- Composting facilities have encountered challenges with odors, and even in-vessel systems have had mixed results.
- The SWA is promoting backyard composting as a viable solution.
- Regarding biosolids, the County currently pelletizes its material. However, the lack of suitable land for application remains a significant market constraint.
- Palm Beach continues to monitor state-level legislative proposals that could impact local autonomy in waste management decision-making.

Regional Priorities and Next Steps

1. Regional Education and Outreach

The counties agreed to collaborate on creating shared outreach materials, including a public-facing website or factsheet presented in an accessible Q&A format. These resources will aim to standardize messaging and build public understanding of solid waste processes across the region. Academic

institutions, including the University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS), may serve as partners in distributing this information and enhancing its credibility.

2. Unified Legislative Advocacy
A key goal is the alignment of tri-county legislative priorities to ensure a unified voice in Tallahassee. By coordinating legislative messaging and strategy, the counties aim to better influence state policy on solid waste management, particularly as it relates to infrastructure funding, recycling mandates, extended producer responsibility, and organics regulation. An immediate focus will be placed on advocating for stronger lithium-ion battery disposal laws to improve safety and reduce fire risk.

Conclusion
This regional meeting reflected the shared urgency among Miami-Dade, Broward, and Palm Beach Counties to address mounting solid waste challenges through strategic collaboration with the issues discussed—including landfill capacity, recycling enforcement, organics processing, and biosolid management.

The Department of Solid Waste Management will continue engaging with our regional partners, Broward and Palm Beach counties, and keep the Board informed as initiatives move forward. We remain committed to working collaboratively with Broward County to address our shared solid waste disposal needs, with ongoing discussions potentially leading to a unified approach.

In accordance with Ordinance No. 14-65, this report will be placed on the next available Board meeting agenda, without committee review. If additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

c: Geri Bonzon-Keenan, County Attorney
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ATTACHMENT 7

Directive 250304: Report on the Development and Implementation of Tire and Mattress Recycling

Memorandum

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on the Development and Implementation of Tire and Mattress Recycling - Directive No. 250304

Executive Summary

This report is provided pursuant to Resolution No. R-197-25 ("Resolution"), sponsored by Commissioner Raquel Regalado and adopted by the Board of County Commissioners ("Board") on February 19, 2025. This report provides the Board with an overview of tire and mattress recycling efforts and diversion opportunities in Miami-Dade County. Per Sections 2 and 3 of the Resolution, the County Mayor or designee is directed to develop and implement a countywide recycling program for tires and mattresses, including from junkyards, landfills, private owners, and commercial sites. The report also includes: current data on tire processing by Reworld and American Tire (quantities shredded, recycled, and landfilled); viable mattress recycling alternatives and reasons for previous inaction; estimated quantities and per-unit recycling costs by municipality compared to current expenses; and a solicitation for a new recycling contract. Any necessary changes to Chapter 15 of the County Code to support these recycling efforts are also provided in this report.

Background

Tire Recycling: Miami-Dade County has been receiving and processing tires for beneficial use since the 1980s. Tires are consolidated at the South Dade Landfill and transported to the Resource Recovery Facility ("RRF") to be shredded. The goal was to use these tires as tire-derived fuel ("TDF") in the former waste-to-energy facility, however due to technological barriers, tires were seldom processed at RRF. Instead, tires were shredded and provided to end-market recipients. Tires are still shredded at RRF and taken off-site to be recycled or used for beneficial use. For example, cement manufacturers can use shredded tires as TDF as a fuel supplement when manufacturing cement. Shredded tires can also be used in synthetic mulch manufacturing, manufacturing rubber playground material, and in other methods for beneficial use.

Tire recycling is an effective method of tire disposal, particularly compared to landfilling and illegal dumping. When tires are illegally dumped, they can retain rainwater and act as a breeding ground for mosquito larvae. When landfilled, tires can be very difficult to compact. Accordingly, it is illegal under Florida law to dispose of whole vehicle tires. Tires must be shredded in preparation for landfilling, recycling, or energy recovery. Once shredded, the steel and metallic fiber found in the tires are removed to allow for the rubber to be recycled.

Mattress Recycling: The most common method of mattress disposal is landfilling, but this approach presents several challenges. In particular, mattresses hinder waste compaction— a 50-pound mattress occupies upwards of 0.5 cubic yards of airspace, resulting in an in-place density of 100 pounds/cubic yard. DSWM's goal is to achieve an in-place density of 1,600-1,800 pounds/cubic yard. Additionally,

mattresses can increase oxygen levels beneath the landfill surface, creating a potential fire hazard. Their buoyant nature also causes them to resurface, further complicating landfill operations.

Recycling mattresses enables landfill operators to avoid operational challenges while supporting waste diversion and preserving valuable landfill airspace. Despite these avoided complications, mattress recycling remains uncommon outside of California, Connecticut, Rhode Island, and Oregon, states with mandatory recycling programs. This is largely due to higher costs compared to landfilling, driven by transportation and labor expenses. Transporting mattresses over long distances can be costly, and the recycling process is labor-intensive. While machines exist to deconstruct mattresses, they are often expensive, costing over $50,000 just to shred mattresses; additional equipment is required to separate the wood, metal, and felt once shredded. These costs lead many recyclers to rely on manual labor. Mattress recyclers in Florida charge between $12 to $15 per mattress to help balance these costs. Additionally, most recycling facilities bale the recovered materials to minimize transportation expenses and operate with a small workforce dedicated specifically to mattress recycling.

Most mattress components can be repurposed, regardless of mattress type. Older mattresses are generally easier to recycle due to their diverse materials, which may include quilt panels, polyurethane or latex foam, cotton or fiber fill, shoddy felt, metal springs, and a bottom layer[1]. Newer mattresses, by contrast, often contain fewer material types and are more likely to consist of memory foam, a specialized form of polyurethane foam. Quilt panels are often made from cotton or polyester, along with polyurethane or latex foam, are often shredded and reused in carpet padding. Memory foam, however, is more difficult to recycle due to its unique properties. Some carpet padding manufacturers view it as a contaminant, while others use it exclusively. Fibers used in mattress production are typically not recyclable and are usually landfilled, though cotton can sometimes be blended into insulation. Shoddy felt, which separates foam from springs, is also hard to recycle due to its origin from already recycled materials. Metal springs, on the other hand, are easily recycled and accepted by scrap metal facilities. Bottom layers, made from materials like cotton or polyester, have limited reuse potential but may also be incorporated into carpet padding blends.

DSWM has not implemented an effective mattress recycling program, although the department has explored this several times over the years. Several years ago, DSWM solicited an RFI for mattress recycling, but no companies responded to the RFI. After this RFI, it was recognized that mattress recycling was a challenging waste stream to address. The inability to implement a program has been primarily due to the limited availability of local mattress recyclers.

Current Status and Considerations

Tire Recycling: The County issued a solicitation for tire processing and recycling in 2023 (EVN0008360 Waste Tire Processing and Related Services). American Tire Recycling responded to the solicitation and was awarded the contract. The contract stipulates that American Tire Recycling must have the recycling capacity to recycle 20,000 tons of vehicle tires per year for beneficial use. American Tire Recycling is also expected to annually receive 10 tons of oversized tires or tires with rims, tires that

[1] Mattress Recycling Council (n.d.). *Why Recycle* Why Recycle - Mattress Recycling Council | Recycling Programs in California, Connecticut, Oregon, and Rhode Island

have been traditionally more challenging to recycle. This contract is anticipated to become active upon Reworld ceasing tire shredding operations at RRF.

According to the U.S. Tire Manufacturers Association ("USTMA") Report, 79% of scrap tires were recycled into rubber modified asphalt, mulching material, or for other beneficial use in 2023[2]. This recycling rate represents a decline from the 96% tire recycling rate in 2013. Despite this decline, DSWM continues to shred and provide all of the tires received by DSWM to end markets to be recycled or used as tire-derived fuel ("TDF"). In 2024, Miami-Dade County DSWM processed 13,090 tons of tires at its RRF facility.

Common uses for shredded tires include being used as a fuel source in industrial facilities, feedstock in playground materials, astroturf installations, and as rubber mulch. Recycling tires promotes beneficial reuse while also mitigating any negative impacts they have on the landfill as they are difficult to compress and can often re-emerge after being covered.

Mattress Recycling: In 2024, DSWM received an average of approximately 2000 mattresses per month primarily from County residents, though some are also delivered by municipalities and other entities to its landfills. Customers can drop off mattresses and box springs at 11 of the 13 TRCs, excluding Chapman Field and Richmond Heights. From the TRCs, the mattresses are transported and disposed of in landfills.

In response to the Resolution, DSWM inquired about mattress recycling to Mustard Seed of Central Florida, a non-profit organization that recycles mattresses by deconstructing them and diverting the mattresses' components into respective waste streams. Mustard Seed of Central Florida can receive mattresses from Miami-Dade County, but they do not provide transportation services. It was determined that transporting approximately 60 mattresses per day from Miami-Dade County to Central Florida would be cost prohibitive; DSWM would need to ship one intermodal container each day to recycle all the mattresses it receives. This approach could cost upwards of $500 per shipment, or $10,000 per month.

The DSWM published a Request for Information ("RFI") to solicit input from the mattress recycling industry to help identify solutions that divert mattresses from County landfills. DSWM reviewed the mattress recycling industry and determined that a second RFI would be advantageous to identify new opportunities to recycle mattresses that are received by DSWM. *EVN0025086 Mattress and Box Spring Recycling* was advertised on April 2, 2025. An industry day was held on April 16, 2025. On April 24, 2025, DSWM received RFI responses to evaluate potential opportunities for mattress recycling. After review, DSWM will determine potential next steps and whether mattress recycling can be implemented prior to the development of the Zero Waste Master Plan.

Accordingly, the Request for Proposal ("RFP") for the Zero Waste Master Plan ("ZWMP") published in 2024 required that the ZWMP consultant conduct an analysis and evaluate infrastructure gaps and opportunities to provide options to recycle items that are not currently recyclable within the County; this

[2] U.S. Tire Manufacturers Association (2023). *2023 ELT Tire Report Page | USTMA*

included but was not limited to mattress recycling. Through this process and policy development, DSWM hopes to identify technologies and implement programs that can allow for the effective diversion of mattresses from landfills.

Financial Impact and Waste Generation

Tire Recycling: According to the Federal Highway Administration ("FHA"), it is estimated that approximately one tire is disposed every year for every person in the U.S.[3]

Tire waste is charged a disposal fee of $140.00 per ton except at TRCs where tire disposal is free for DSWM customers. In 2024, the Miami-Dade County Department of Solid Waste Management ("DSWM") processed 13,090 tons of tires at the RRF Facility. These tires, along with all other tires received by DSWM, continue to be recycled and processed for beneficial use.

Mattress Recycling: The Mattress Recycling Council posits that 50,000 mattresses are disposed every day across the United States, or approximately 18,250,000 mattresses per year[4]. This is approximately 1 mattress disposed each year for every 18.5 individuals.

These metrics were used to extrapolate the anticipated waste totals for tires and mattresses for each respective municipality. Cost was omitted from this analysis since municipalities currently do not pay to directly dispose of their residents' mattresses or tires. DSWM customers are allowed to drop off tires and mattresses at TRCs free of charge.

Municipality	Population (2023) (excluding inmates)	Estimated Mattress Waste (Number of Mattresses)	Estimated Tire Waste (Number of Tires)
Miami	464,283	25,096	464,283
Homestead	83,997	4,540	83,997
Florida City	17,173	928	17,173
Miami Beach	83,230	4,499	83,230
Coral Gables	50,813	2,747	50,813
Hialeah	230,575	12,464	230,575
North Miami	59,955	3,241	59,955
Opa-Locka	16,560	895	16,560
Miami Springs	13,866	750	13,866
South Miami	12,018	650	12,018
Golden Beach	981	53	981
North Miami Beach	43,575	2,355	43,575
Miami Shores	11,553	625	11,553
Biscayne Park	3,030	164	3,030
Surfside	5,401	292	5,401
El Portal	2,236	121	2,236

[3] Federal Highway Administration Research and Technology.(n.d.) *Scrap Tires - Material Description - User Guidelines for Waste and Byproduct Materials in Pavement Construction - FHWA-RD-97-148*

[4] Mattress Recycling Council. (n.d.) *Our Impact - Mattress Recycling Council | Recycling Programs in California, Connecticut, Oregon, and Rhode Island*

Indian Creek Village	89	5	89
Sweetwater	21,393	1,156	21,393
North Bay Village	7,977	431	7,977
West Miami	7,257	392	7,257
Bay Harbor Islands	5,793	313	5,793
Bal Harbour	3,010	163	3,010
Virginia Gardens	2,374	128	2,374
Hialeah Gardens	22,303	1,206	22,303
Medley	1,050	57	1,050
Key Biscayne	14,603	789	14,603
Aventura	40,104	2,168	40,104
Pinecrest	18,304	989	18,304
Sunny Isles Beach	22,788	1,232	22,788
Miami Lakes	30,839	1,667	30,839
Palmetto Bay	25,091	1,356	25,091
Miami Gardens	115,364	6,236	115,364
Doral	82,175	4,442	82,175
Cutler Bay	45,026	2,434	45,026
Unincorporated	1,201,375	64,939	1,201,375
Total	2,766,161	149,523	2,766,161

Recommended Changes to the Code

Tire Recycling: Chapter 15 of the Code has several sections dedicated to regulating the management, transport, and disposal of tires. Although all vehicle tires received by DSWM are recycled, it is recommended that the Code be amended to require all waste tires in the County to be shredded and processed to be used in secondary end markets, including in facilities that use shredded tires for manufacturing purposes or as TDF.

Mattress Recycling: Chapter 15 of the Code regulates mattresses insofar as they are packaged in preparation for bulky waste pick-ups. As DSWM strives to recycle mattresses and has issued an RFI for mattress recycling, it is recommended that the County solicit feedback from the mattress recycling industry prior to making any recommended changes to the Code. If a mattress recycler can provide mattress recycling services to the County and has a throughput capacity that can manage the mattress waste county-wide, the Code could be amended to require all mattresses be recycled within Miami-Dade County. These recommended changes to the Code are dependent on the RFI responses received by DSWM.

Conclusion

The DSWM is working towards developing a Zero Waste Master Plan which has the goal of maximizing waste diversion. Two significant waste streams that are difficult yet critical to divert from landfills are tires and mattresses. DSWM has effectively recycled tires for decades and will continue to build on the success of this recycling program. Mattress recycling, however, has been a challenge. As DSWM works toward waste diversion, it will identify methods to divert mattresses from landfills that are both environmentally and financially sustainable. Given the County's commitment to waste diversion and preserving landfill capacity, it is committed to exploring alternative, beneficial uses for mattresses to reduce reliance on landfilling.

In accordance with Ordinance No. 14-65, this report will be placed on the next available Board meeting agenda, without committee review. If additional information is needed, please contact Aneisha Daniel, PhD, Director Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

c: Geri Bonzon-Keenan, County Attorney
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ATTACHMENT 8

Directive 250224: Report on Methane Gas Extraction at Existing Miami-Dade County Landfills

Memorandum

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on Methane Gas Extraction at Existing Miami-Dade County Landfills - Directive No. 250224

Executive Summary

This report is provided pursuant to Resolution No. R-194-25 ("Resolution"), sponsored by Commissioner Raquel Regalado and adopted by the Board of County Commissioners ("Board") on February 19, 2025. This Resolution directed the Mayor or Mayor's designee to prepare a report to the Board with recommendations for implementing and monetizing methane gas extraction. This report serves as a comprehensive review of the existing methane gas extraction operations at Miami-Dade County landfills and includes evaluations of potential opportunities to beneficially use the captured landfill gas (LFG). It also examines legally viable options for methane gas extraction from all County landfills and all future landfills.

Additionally, the report includes an assessment of comparable projects and facilities in Florida, such as the Medley Landfill methane gas project and progress, Nopetro plant in Vero Beach and the New River RNG project. The evaluation includes permitting time and agencies, capital costs, operations/maintenance costs, and any other information relevant to the recommendations. The evaluation does not include an overview of increased cost per ton to municipalities or the unincorporated municipal service area ("UMSA"), including a breakdown by commission district, as this is a revenue generating project and would have no anticipated costs.

Background

Miami-Dade County has been effectively capturing LFG from both North Dade Landfill ("NDL") and South Dade Landfill ("SDL") for decades. LFG is a byproduct of waste decomposition in landfills and is predominantly composed of methane, a potent greenhouse gas. The Department of Solid Waste Management ("DSWM") currently monitors and manages our LFG by collecting it from gas collection wells and combusting the gas at flaring stations. The collection of LFG is standard and required by the U.S. Environmental Protection Agency ("EPA") for landfills that are the size of the County's landfills. The Florida Department of Environmental Protection (FDEP") enforces these regulations on landfills throughout the state.

Methane has a global warming potential 27-30 times greater than carbon dioxide[1]. According to the EPA, landfills account for more than 14% of methane emissions— these methane emissions are emitted in the form of LFG[2]. Although flared, the methane emissions from LFG at NDL and SDL can be used for beneficial use. Using captured LFG can be converted into renewable natural gas ("RNG").

[1] Environmental Protection Agency. (n.d.). *Understanding Global Warming Potentials | US EPA*.
[2] Environmental Protection Agency. (n.d.). *Basic Information about Landfill Gas | US EPA*.

Converting LFG to RNG can help reduce emissions while also acting as a revenue stream for DSWM. According to market research conducted by DSWM, the Department may be able to generate upwards of $1,000,000 in annualized revenue from RNG created from its existing LFG while also reducing emissions.

The Miami-Dade County DSWM is required under federal and state regulations to extract and capture LFG from its landfills. The EPA sets standards for how landfills and the gases generated by landfills should be managed— FDEP is responsible for ensuring landfills comply with both federal and state requirements. The New Source Performance Standards ("NSPS") rules regulating landfills were published on March 12, 1996. These regulations required landfills of a certain size and design capacity to reduce emissions from LFG. This rule required LFG to be captured and either flared or used for beneficial use. Since these regulations were adopted, DSWM has extracted LFG and flared it at existing county-owned landfills.

FDEP ensures that DSWM maintains compliance with these regulations as part of the Title V permitting requirements for both NDL and SDL. As part of DSWM's landfill Title V permitting requirements, the landfills are required to comply with the requirements of 40 CFR 60.752[3]. These requirements include:

A. An active gas collection system shall:
    1. Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control or treatment system equipment;
    2. Collect gas from each area, cell, or group of cells in the landfill in which the initial sold waste has been placed for a period of:
        i. 5 years or more if active; or
        ii. 2 years or more if closed or at final grade.
    3. Collect gas at a sufficient extraction rate;
    4. Be designed to minimize off-site migration of subsurface gas.

To achieve compliance, 40 CFR 60.752 also requires all collected gas to be routed to a control system that includes either an open flare designed and operated in accordance with 40 CFR 60.18, except as noted in 40 CFR 60.754(e) or routed to a treatment system that processes the collected gas for subsequent sale or use. DSWM routinely reports its emissions from the NDL and SDL to both FDEP and EPA.

According to the EPA, landfills account for 14.4% of all methane generated in the U.S. Methane has a global warming potential 28 times greater than carbon dioxide. To mitigate this impact, LFG is often flared, or combusted. Combustion of LFG converts the methane into carbon dioxide, mitigating the environmental impact of landfill operations. However, emissions from landfills can be further reduced by converting LFG into RNG. RNG can be used to generate heat, electricity, compressed natural gas ("CNG") to be used in vehicles, or can be directly fed into existing natural gas infrastructure. According to the International Energy Agency, LFG can help "provide system benefits of natural gas without the

[3] Standards for air emissions from municipal solid waste landfills. (1996). 40 C.F.R § 60.752 (b)(2)(ii)(A)

net carbon emissions."[4] Additionally, the U.N. Intergovernmental Panel on Climate Change ("IPCC") recognizes that harvesting LFG to be used as RNG can reduce overall emissions and can help reduce the carbon intensity of certain sectors, like the transport sector[5]. According to the EPA's *Landfill Gas Energy Benefits Calculator,* the avoided carbon dioxide emissions from the use of fossil fuels (estimated from displacing natural gas) is over 22,000 tons of CO_2/year. Furthermore, FDEP considers LFG used for beneficial use as recycling credits— capturing the County's landfill gas and generating RNG or electricity from it would assist in increasing the County's overall recycling rate.

RNG is considered to be a commodity because of the end markets that can use RNG. RNG can be used to create compressed natural gas (CNG) to fuel vehicles, to generate electricity, or can be directly fed into existing natural gas infrastructure. Because RNG is renewable, there are credits known as Renewable Identification Numbers ("RINs") that can also be sold in a separate end market. The generation of RNG and RINs from DSWM's LFG provides an opportunity for the County to reduce greenhouse gas emissions while also generating a net revenue. LFG-to-RNG conversion services have been provided to landfills for decades. As the cost of conversion technology has decreased and as the goal to mitigate climate impact has become more pressing, more landfills are beginning to adopt this technology. Some landfills have even used RNG to produce CNG, which is then used to fuel garbage trucks.

The current state of the RNG industry is quite robust. The EPA has published data illustrating that LFG to RNG projects have increased by 21% from 2022 to 2023[6]. The industry is continuing to grow as the technology to convert LFG into RNG becomes cheaper, thereby opening up other landfills to the industry. The end market for RNG is also growing as utilities begin to set emission reduction goals. As technology has advanced over the years, landfills across the world—including in Florida— have started integrating RNG producing capabilities at their landfills.

For example, New River Solid Waste Association ("NRSWA") in Raiford, FL has been processing LFG into RNG for nearly a decade. DSWM and Strategic Procurement Department staff conducted a site visit to NRSWA in November 2024 to help guide the development of the County's RFP. NRSWA shared that they continue to generate revenue from their RNG system. Waste Management ("WM") has also developed RNG facilities throughout Florida. WM is currently developing two RNG facilities at the Okeechobee Landfill (10800 NE Ave, Okeechobee, FL 34972) and Medley Landfill (9350 NW 89th Ave, Medley, FL 33178). According to WM, the total permitting time for their RNG project in Medley was approximately one year. Permitting included building permits from the Town of Medley, air permits from FDEP, and a Class 6 construction permit from the Regulatory and Economic Resources Department's Division of Environmental Resources Management. WM also shared that they were able to develop the RNG project without increasing tipping fees or increasing costs on customers because of the anticipated revenue that will be generated from the RNG project. No Petro Vero Beach, an RNG plant in Indian River County, is set to open in 2025. The $40 million project took over nine months to permit, from

[4] International Energy Agency. (n.d.). *An introduction to biogas and biomethane – Outlook for biogas and biomethane: Prospects for organic growth – Analysis - IEA*.
[5] United Nations Intergovernmental Panel on Climate Change. *IPCC Waste Management Chapter*
[6] Environmental Protection Agency. (n.d.). *Renewable Natural Gas | US EPA*

design drawings to building and air permits, and is expected to generate revenue for Indian River County and reduce greenhouse emissions by 30,000 metric tons per year.

According to the Coalition for Renewable Natural Gas, the cost of producing RNG from LFG is dependent on the amount of RNG that will be produced (measured in Million British Thermal Units ("MMBtu")). The Coalition estimates that the cost of producing RNG is approximately ~$16.5/MMBtu[7]. This cost is usually significantly lower than the market value of the RNG, which allows RNG projects to act as net revenue generators.

Financial Costs

DSWM has conducted extensive market research on the beneficial use of LFG. As previously mentioned, DSWM's market research indicated that the net revenue DSWM may generate from an RNG project may be upwards of $1,000,000 annualized. Most LFG-to-RNG projects do not come at a cost to the LFG generator, as it is financially lucrative for RNG developers to pay for the design, construction, and operation of these facilities. Accordingly, DSWM does not anticipate any project that converts LFG for beneficial use to have any cost to DSWM or County as this is a revenue generating project.

Current Status

DSWM contracted SCS Engineering to assist with the market research and development of a Request for Proposal ("RFP") for converting LFG to RNG. Extensive market research was conducted, and a draft scope of services was completed in April 2024. As DSWM further engaged the Strategic Procurement Department ("SPD"), it was determined that surveys and appraisals would need to be completed for a lease agreement, which would be required under this project. The draft scope of services was modified to incorporate these changes. As previously mentioned, DSWM and SPD also attended a site visit to learn about existing RNG infrastructure at the NRSWA in November 2024.

DSWM, in collaboration with SPD, has prepared an RFP to identify potential RNG developers to convert LFG from NDL and SDL into RNG at their expense. These RNG developers would be responsible for converting the LFG to RNG and selling it to end markets and would participate in revenue sharing with DSWM. The RFP was advertised in the coming months. Through this RFP process, DSWM hopes to identify technologies that can allow for the beneficial use of LFG that generates revenue and reduces emissions. It is anticipated this RFP will be advertised in Summer 2025.

Conclusion

The County has set a goal of reducing greenhouse gas emissions by 50% by 2030. Although waste accounts for less than four percent (4%) of the County's overall greenhouse gas emissions[8], it is critical that all departments incorporate emissions reduction strategies. Additionally, a project that converts LFG to RNG would act as a revenue stream for DSWM, illustrating that emissions reduction and revenue generation can coexist. This initiative is also aligned with my Administration's WISE 305 Initiative, as it will diversify revenue streams for DSWM. Deployment of an LFG-to-RNG System will

[7] The Coalition for Renewable Natural Gas. (n.d.). *RNG Market Today- A Primer*
[8] Miami-Dade Climate Action Strategy (2021). climate-action-strategy-final-draft.pdf

enable DSWM to reduce emissions, generate revenue, and maintain compliance with EPA and FDEP regulations.

In accordance with Ordinance No. 14-65, this report will be placed on the next available Board meeting agenda, without committee review. If additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

c: Geri Bonzon-Keenan, County Attorney
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ATTACHMENT 9

Directive 250172: Report on the Review of Solid Waste Bond Ordinance

Memorandum

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on Solid Waste Bond Ordinance – Directive No. 250172

Executive Summary

On February 19, 2025, the Board of County Commissioners ("Board") approved Resolution No. R-189-25, sponsored by Commissioner Raquel Regalado, directing the County Mayor or County Mayor's designee to review the Miami-Dade County's Solid Waste System (SWS) Bond Ordinance (Master Bond Ordinance) and provide recommendations to restructure or reformulate such Ordinance, including defeasance of any outstanding bonds.

This memorandum provides a summary of the administration's actions and progress in response to the directive issued by the Board concerning the review of the Master Bond Ordinance. Our efforts are aligned with the objectives to enhance fiscal responsibility, explore innovative financing mechanisms, and improve operational efficiency within the solid waste management system. The administration remains committed to implementing these directives without compromising the integrity and functionality of the SWS.

The administration has initiated a comprehensive review of Ordinance No. 96-168, which constitutes the Master Bond Ordinance. This review aims to identify opportunities for restructuring or reformulating the ordinance, including the potential defeasance of outstanding bonds. Our goal is to ensure the ordinance aligns with current financial practices and supports the long-term sustainability of the SWS.

To facilitate the Department's review of the Master Bond Ordinance, we have engaged and received input from bond counsel and our financial advisors. These professionals assisted the Department in providing expertise in reviewing the Master Bond Ordinance to ensure any modifications serve the County's best interests and comply with legal and financial standards.

It is recommended that the Master Bond Ordinance be modified in conjunction with the Department's next bond issuance to provide additional operating and financing flexibility for alternative financing mechanisms, as well as bringing covenants into alignment with current practices and consistent with the prudent operation of the System.

Below is an outline of the specific items reviewed and an overview of potential changes and initiatives that the Board may consider.

Amendment Provisions of the Master Bond Ordinance

Under Article VIII of the Master Bond Ordinance, the County has the authority to enact supplemental ordinances without bondholders' consent for specific purposes, such as 1) correcting ambiguities or inconsistencies, 2) granting additional rights or protections to bondholders, 3) adding covenants,

conditions, or restrictions, and 4) making other changes that are not adverse to bondholders' interests. However, substantive amendments that materially alter bondholders' rights or obligations typically require their consent. Therefore, while some recommendations may be implemented unilaterally by the County, most recommended changes to the Master Bond Ordinance would necessitate bondholder consent.

Potential changes to the Master Bond Ordinance include, but are not limited to:

- Modifying and/or adding defined terms, including Pledged Revenues, Principal and Interest Requirements, Investment Obligations, Contract Obligations, System, and Improvements to provide modernized definitions and increase flexibility.
- Expanding the list of modifications that may be made without bondholders' consent to include additional provisions, such as facilitating the rights and interest of a credit facility provider.
- Providing flexibility for alternative lien structures (e.g., subordinate and junior lien) and providing the ability to additionally secure bonds with additional revenues (e.g., general obligation and covenant to budget and appropriate).
- Permitting special purpose bonds payable solely from revenues resulting from a lease, loan agreement, installment sales agreement, or other agreement or financing arrangement relating to the special purpose facilities
- Providing flexibility, if deemed advantageous, to release certain revenues from the Pledged Revenues.
- Modifying the additional bonds test to provide more flexibility in issuing additional bonds.
- Allowing for adjustments to Net Operating Revenues for purposes of the rate covenant and additional bonds test when revenues other than Pledged Revenues are used to fund operating expenses or principal and interest requirements.
- Correcting ambiguities in the conditional redemption language to provide for a contingency for the issuance of refunding bonds.
- Modifying certain existing covenants to provide additional operating flexibility while maintaining sound financial practices. This may include providing some relief to covenants such as "enforcement of collections" when a state of emergency has been declared.

In order to make the above changes to the Master Bond Ordinance, the County would need to obtain consent from 51% of the outstanding bondholders. This can be achieved by one of the following methods: 1) defeasing the outstanding bonds to their redemption date using available funds, 2) calling the outstanding bonds on or after their earliest call date using available funds, 3) obtaining consents from the majority of bondholders, 4) refunding the outstanding bonds by issuing refunding bonds under the modified Master Bond Ordinance, or 5) obtaining consent through the issuance of additional bonds whereby the new bondholders provide consent and amount to greater than 51% of the outstanding bonds upon their issuance. It should be noted that except for option 5 in the preceding sentence, obtaining consent from bondholders could be difficult and may not be the cleanest way to modify the Master Bond Ordinance.

The following are certain potential benefits and disadvantages of defeasing or calling the currently outstanding bonds using available funds:

Advantages

- Enable the County to immediately terminate the covenants under the current Master Bond Ordinance.
- Save on interest expense over the remaining term of the bonds.
- Allow the County to create a new modernized bond ordinance when it issues its next series of bonds.

Disadvantages

- Lack of covenants and requirements under the ordinance will only be temporary until the County enacts a new bond ordinance with its next series of bonds that includes new covenants and restrictions.
- Certain covenants under the Master Bond Ordinance provide the Department with the legal standing and requirement to collect and enforce the collection of revenues for the System.
- The Department would be using available cash or proceeds that it would otherwise utilize to fund project costs or operating expenses. The Department may have to borrow additional funds in the future to replace this cash, and the future borrowing could have a higher interest cost than the currently outstanding bonds.
- The outstanding bonds have interest rates ranging from 3.0% - 5.0% through their final maturity in 2030. Depending upon the interest the Department currently earns on its unrestricted cash, the interest expense on certain bond maturities may be lower than the interest earnings that the Department is generating on this cash. Defeasance or redemption may not be economically advantageous if unrestricted cash must be used.

Innovative Financing Mechanisms

The key financial issues that the current administration and previous administrations have tried to address are the requirements to adequately fund the residential collections operation, maintain sufficient disposal capacity to include building a new Waste-To-Energy (WTE) facility, expansion of landfilling options, other emerging technologies, and providing equitable service delivery across the entire County.

To address these challenges, the administration is evaluating, among others, the following alternative funding mechanisms:

1. **Continuation of the Current Fee-Based Structure:** Maintaining the existing model, which may require adjustments to fees to cover rising costs. The Master Bond Ordinance requires the Department to adjust rates to meet minimum coverage levels (120%).

2. **Countywide Ad Valorem Tax Revenue:** Introducing a property tax-based funding mechanism to distribute costs more broadly and provide additional capacity to finance system improvements. This would allow additional funding to compensate for personnel and operating expense growth outpacing revenues and may provide for additional bonding capacity for capital projects.

3. **Hybrid Approach with Non-Public Entities**: Forming partnerships with private entities to leverage additional resources and expertise. The use of special purpose bonds and released revenues may provide some flexibility with potential public-private project funding.

4. **Pay-A-You-Throw (PAYT) Policy**: Implementing a PAYT model by which residents would be charged based on the volume or weight of waste they generate, rather than a uniform flat fee. This rate structure promotes a more equitable system by aligning fees more closely with actual service usage. Additionally, PAYT incentivizes waste reduction and diversion, supporting the County's broader environmental and sustainability goals while ensuring the financial sustainability of collection operations.

Each option presents unique challenges and advantages, requiring thoughtful communication and well-planned implementation strategies. To strengthen the fiscal stability of the SWS, the administration is actively exploring all these innovative financing approaches. These include mechanisms aimed at delivering cost-effective solutions while attracting investment in environmentally responsible projects. Given the complexity of the SWS infrastructure, any proposed changes will demand careful planning and approval by the Board. It should be noted that current state law imposes strict limitations on the use of environmental, social, and governance (ESG) considerations in state and local government financial activities (Florida House Bill 3, HB3 - Anti ESG Legislation). As a result, certain funding tools, such as designated "green bonds", are not currently permitted.

Exploration of Alternative Funding Sources for DSWM

In addition to the review of financing alternatives, we are actively seeking alternative funding sources to support the Department's operations. This includes pursuing state and federal grants, identifying new revenue sources, and evaluating other creative financing strategies. Over the past three years, the Department has secured approximately $2.7 million in grants from agencies, including the Florida Department of Environmental Protection and the U.S. Environmental Protection Agency. These funds have been instrumental in, among other uses:

- Acquiring new vehicles aimed at reducing emissions and improving service efficiency;
- Conducting environmental studies to assess and enhance existing stormwater infrastructure, addressing challenges such as increased runoff and sea-level rise; and
- Implementing stormwater improvements at departmental facilities to mitigate current and future flooding risks.

The objective is to diversify funding streams to reduce reliance on traditional sources and enhance financial resilience.

As discussed earlier, the Department reviewed the potential for alternative revenue funding in the form of ad valorem taxes. The Department has also reviewed the potential for capital assessments. While these options would provide a broad payor base and significant revenue to the Department, the use of a capital assessment for certain projects can introduce additional complexity. The use of ad valorem revenue, through the County-wide operating millage, would provide a more sustainable source of revenue to fund a portion of the operating expenses of the Department. This would allow more operating revenue to be available to the Department to fund debt service payments or capital improvements instead of funding operating expenses. Modifications to the Master Bond Ordinance could be made to provide additional flexibility in the event the County utilizes these or other sources of revenue.

Assessment of DSWM Site Development and Expansion

In response to an additional directive, the Department is evaluating the feasibility of developing existing SWS sites to increase capacity and enhance operational efficiency. A comprehensive study is currently

in progress to maximize the use of existing assets and to identify potential new sites for future acquisition. These initiatives support the Department's long-term operational, environmental, and logistical goals, ensuring the SWS infrastructure is strategically positioned to meet both current and future service needs.

Per Ordinance No. 14-65, this memorandum will be placed on the next available Board meeting agenda, without committee review. Should you have any questions or if additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

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ATTACHMENT 10

Directive 250166: Report to the Board Regarding New Technologies Available for the County's West Transfer Station Facility

Memorandum

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report to the Board Regarding New Technologies Available for the County's West Transfer Station Facility – Directive No. 250166

Executive Summary

On January 28, 2025, at the Committee of the Whole meeting, Commissioner Kevin Marino Cabrera directed the Department of Solid Waste Management (DSWM) to provide the Board of County Commissioners (Board) with a report on new technologies available for the County's West Transfer Station (WTS) facility and potential implementation timelines for these technologies.

DSWM has reviewed a variety of emerging technologies that could enhance operations at WTS. The department has evaluated each technology based on its compatibility with the existing infrastructure, anticipated benefits, and the feasibility of integrating these innovations into current workflows. After careful analysis, the department has provided cost-effective and practical recommendations, ensuring a smooth implementation timeline while maintaining operational efficiency at the WTS facility.

In addition, DSWM is currently working on the design for a new transfer station as part of the waste complex at Old South Dade Landfill. The Department is committed to ensuring that the new transfer station will be designed to minimize the potential for odor using the latest odor mitigation technologies.

Background

The West Transfer Station is located at 2900 SW 72nd Avenue, east of the Palmetto Expressway and south of Coral Way (SW 24th Street). The facility began operations in 1982 and is open to the public six days a week, Monday through Saturday, from 7:00 a.m. to 5:30 p.m. On Sundays, the facility receives solid waste from the County's Trash & Recycling Centers from DSWM roll-off trucks only.

The facility handles Class I and Class III solid waste. Class I waste includes non-hazardous waste such as garbage, rubbish, refuse, special waste, and other discarded material resulting from domestic, industrial, and commercial operations. Class III waste includes yard waste, construction and demolition debris, processed tire chips, asbestos, carpet, cardboard, paper, glass, plastic, and furniture.

The waste is placed inside a transfer station building on a tipping floor by collection trucks that typically transport 8 to 12 tons of waste. Class I waste is unloaded onto the northwest side of the tipping floor, where loaders push it toward one of three load-out stations. Each station is equipped with a knuckle-boom crane. When a tractor-trailer is in place, the loader pushes the waste into a chute that feeds directly into the tractor-trailer. The crane is used to distribute the load in the trailer; tractor-trailers can transport approximately 16 to 23 tons of waste. All waste is removed from the facility within 48 hours on a first-in, first-out basis.

Trash is unloaded directly into a surge pit at the southeast end of the tipping floor. A bulldozer operator works in the pit to compact and push trash up and over the northeast end of the pit into the load-out chute. A base-mounted knuckle-boom crane is located on the other side of the chute to assist in truck loading.

Due to the nature of the waste, there is a potential for off-site odors to impact the surrounding communities. Off-site odors can be minimized by reducing the duration of time the waste is on the tipping floor, by using odor control chemicals at the tipping floor, and by using odor control chemicals around the perimeter of the transfer station buildings.

Review of New Technologies

In order to address this directive, DSWM reached out to the Bond Engineer Arcadis, Inc., to help identify emerging technologies that help minimize off-site odors. The report (Exhibit 10-A) identified the following approaches to help minimize off-site odors:

1. **High-speed Automatic doors:** High-speed overhead doors for standard truck openings can cost approximately $40,000 or more—a transfer station would have multiple overhead doors. Annual operational costs for each high-speed overhead door are generally low as they are constructed of durable materials and engineered for heavy usage. However, these doors can be easily damaged by trucks or equipment traffic and should be protected by heavy bollards or other similar measures.

2. **Additional Tipping Floor Space:** This option increases the size of the building and can increase the capital and operational costs significantly depending on the amount of increased tipping floor area.

3. **Negative pressure**: This option requires substantial mechanical infrastructure, is expensive, and can add millions in capital costs depending on the design. Annual operating costs are high due to electrical demand, maintenance of mechanical systems, and air exhaust treatment systems such as biofilters, carbon stacks, etc.

4. **Air curtains**: These systems add approximately $50,000 - $60,000 in capital costs per structure opening. Operational costs are high due to electrical demand and maintenance requirements.

5. **Odor control systems:** Misting and vapor-mist systems add $50,000 or more to capital costs depending on the area covered and system configuration. For either system, operational costs are high due to electrical demand, water usage (for misting systems), maintenance, and chemical usage.

Operational Controls: In order to minimize off-site odors, transfer stations must be operated to minimize conditions that lead to odor generation. Some of the best practices used in the industry to accomplish this include the following:

- Keep doors closed – retain generated odors within the facility as much as possible.
- Regular facility cleaning – remove debris and wash the tipping floor, push walls, chutes, compactors, and other surfaces that contact and accumulate waste.
- Rapid waste turnover - clearing all waste from the facility within 24-48 hours of receipt ensures that the waste is as young as possible, and the moving and loading activities help reduce anaerobic conditions.
- Performing all truck cleanouts inside the facility.

Feasibility of Implementing New Technologies at WTS

We have evaluated each of the above options and have the following comments:

1. **High-speed Automatic Doors:** Due to the configuration of the tipping floor, we cannot have a dedicated inbound and outbound truck access lane to the tipping floor. As such, it will not be feasible to retrofit the entrance to the tipping floor with high-speed automatic doors.
2. **Additional Tipping Floor Space:** As this is an existing facility, it will not be feasible to increase the size of the tipping floor due to space constraints.

3. **Negative Pressure:** Due to space constraints and facility design needed to house either an activated carbon or biofilter treatment system, this is not a feasible option. It is also not feasible to fully enclose the building and treat the air prior to discharge.

4. **Air Curtains:** We are currently analyzing the possibility of installing air curtains at strategic locations at the tipping floor for its effectiveness.

5. **Odor Control System**: We currently use a misting system and continue to evaluate its effectiveness.

6. **Operational Controls**:

    a. ***Facility Maintenance****:* We have also instituted a daily program to pick up litter around the station daily to maintain proper aesthetics, as well as weekly washing and spraying of the tipping floor with odor-neutralizing materials.
    b. ***Rapid Waste Turnover****:* We are in the process of sending all the waste from WTS by rail. We have procured 42 new chassis and will be using shipping containers to transport over 23 tons per load. By increasing the number of tons transported in each container, we expect to reduce the number of trips needed to remove all the garbage from the tipping floor, reducing the time garbage is left on the tipping floor.
    c. ***Equipment Upgrades***: We are in the process of replacing two of the knuckle-boom cranes. This will help ensure all three of the chutes are operational with reduced downtime and will help move waste more efficiently from the tipping floor.
    d. ***Backup Power****:* We installed a backup generator to ensure all our equipment, including the knuckle-boom cranes, are operational during power outages.
    e. ***Tipping Floor Repairs****:* We have repaired the tipping floor and placed high-strength concrete in order to extend the life of the floor and reduce downtime.
    f. ***Surge Pit Repairs***: We are in the process of repairing the surge pit. We will be placing a 12” concrete floor to extend its life and reduce downtime.
    g. ***Stormwater Improvements***: We are in the process of redesigning the stormwater management system. This will reduce the potential for localized flooding, minimizing flooding of the tunnels that serve as load out areas.
    h. ***Replacement of Transfer Station Roof***: We are in the process of designing a new roof for the transfer station building. This will help minimize stormwater intrusion and minimize the potential for odor.

The department is currently working on the design for a new transfer station as part of the waste complex at Old South Dade Landfill. The Department will ensure that the new transfer station will be designed to minimize the potential for odor using the latest odor mitigation technologies.

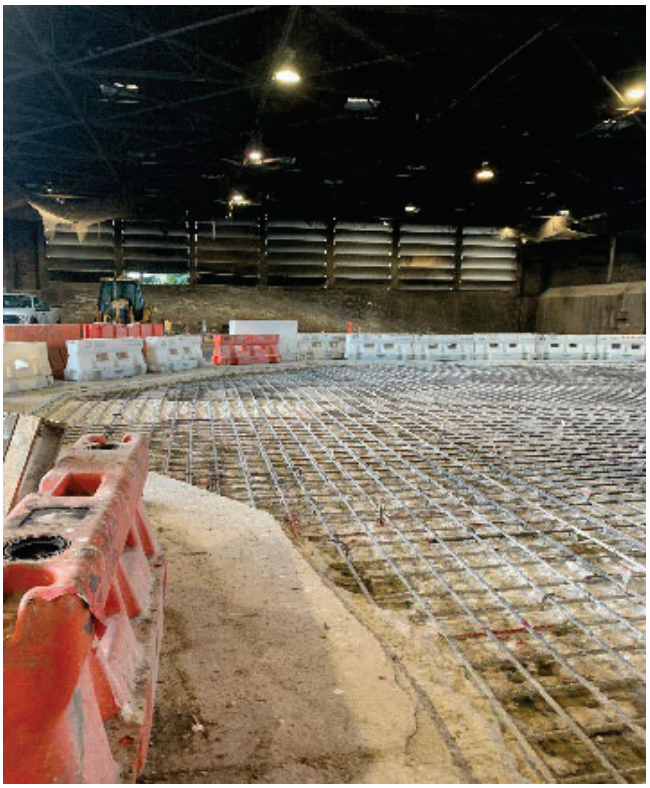
Summary of Improvements
The following is a summary of completed and future projects that will help mitigate off-site odors:

Odor Control System: In December 2022, DSWM issued an Invitation to Quote (ITQ) for an Odor Control System. The odor control system was installed along the perimeter of the facility's roof and along the entrance of the tipping floor door. In April 2023, the system was expanded to include the entire tipping floor and the Class I loading bays. The system has the capability of pumping approximately 8 gallons per minute and can withstand running continuously for approximately 17 hours per day, seven days a week. The chemical product selected is a neutralizer and is sprayed/misted into the air as a fine mist/vapor. This vapor phase neutralizer consists of a specially formulated mixture of chemical compounds in liquid form. When they are mixed or diluted with water and sprayed into the atmosphere, they reduce odorous compounds in the air. The neutralizer is effective at a dilution ratio of 1000:1.

New Backup Generator: This project involved adding a new backup generator to the facility so the facility can continue to operate during major power outages. This project was completed in 2024 at a cost of $225,000.

Tipping Floor Repairs: The project included the demolition of the existing concrete tipping floor topping slab, and the installation of a new concrete topping slab with a minimum thickness of 4 inches (Figure 1). It also involved repairing the structural concrete tipping floor, bumper stops, and the North and South concrete push walls to accommodate the installation of new steel plating. The existing steel plating was removed and replaced with new plating. The total cost for construction in FY 2023 was approximately $1,010,000.

Figure 1 – Tipping Floor Repairs



Surge Pit Repairs: This ongoing project, awarded in February 2025, involves the repair of the existing concrete slab in the surge pit (Figure 2). The demolition phase has been completed, and work is currently progressing on the installation of a new concrete slab. The project is scheduled to last 150 calendar days, with estimated engineering costs totaling approximately $1,000,000.

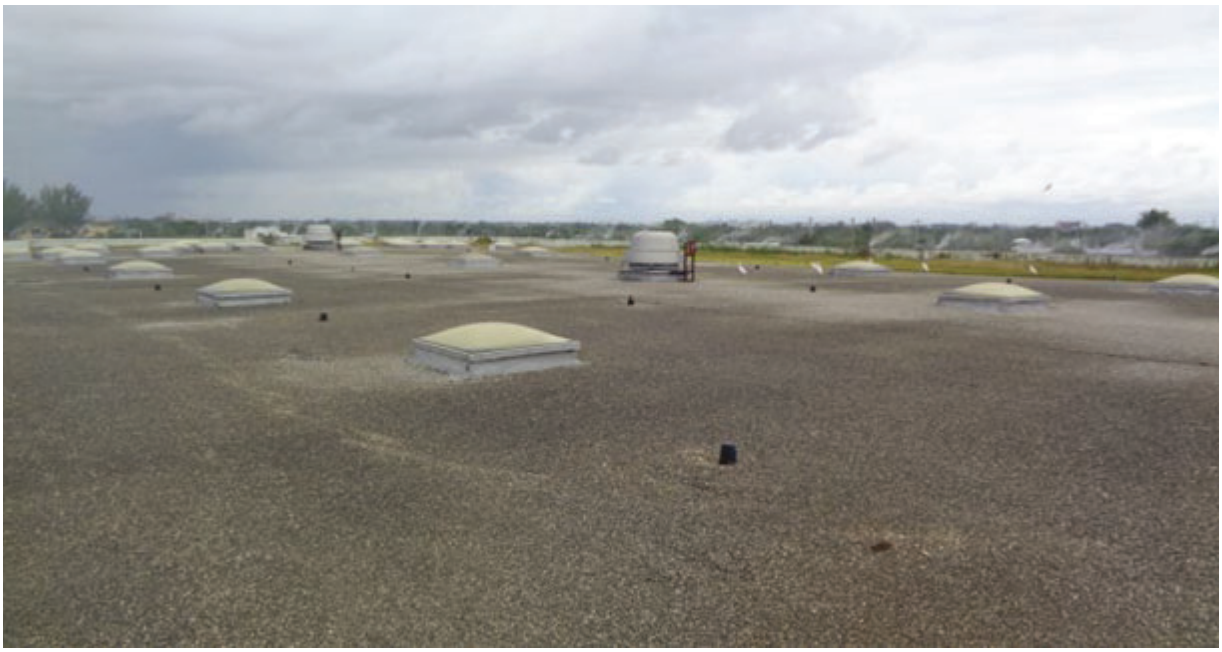
Figure 2 – Surge Pit Repairs

Stormwater Improvements: The goal of this project is to prevent flooding during heavy rainstorms in the below-grade truck loading bay (tunnel) located beneath the station's surge pit (Figure 3). The project includes adjustments to the grading at the tunnel's entrance and exit, as well as upgrades to the tunnel's drainage and pumping systems. Currently in the design phase, the construction is scheduled for completion by September 2026. The design is estimated to cost approximately $265,000.

Figure 3 – Stormwater Improvements to the Station's Loading Bay

Transfer building roof replacement and other improvements: This project entails replacing the approximately 56,000-square-foot roof of the station building, along with additional miscellaneous building improvements yet to be determined (Figure 4). The design phase for this project is scheduled for October 2025.

Figure 4 – Transfer Station Building Roof Replacement



Asphalting: The proposed project involves milling and resurfacing all asphalt pavement areas within the facility boundaries, partially reconstructing the concrete slabs, improving drainage systems, replacing necessary wheel stops, and updating signage and pavement markings as outlined in the project specifications. While the existing stormwater management system will remain unchanged, any damaged drainage grates will be replaced.

In accordance with Ordinance No. 14-65, this report will be placed on the next available Board meeting agenda, without committee review. Should you have any questions or if additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

Attachment:
Exhibit 10.1 - Transfer Station Odor Control Arcadis Memo

C: Geri Bonzon-Keenan, County Attorney
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Office of Policy and Budgetary Affairs

EXHIBIT 10.1

Transfer Station Odor Controls
Arcadis Memo

EXHIBIT 10.1

Memo

FL Engineering License #7917
FL Geology License #GB564

SUBJECT
Transfer Station Odor Control

TO
John Wong
Assistant Director, Technical Services and Environmental Affairs Division
Miami-Dade Department of Solid Waste Management
2525 NW 62nd St., 5th Floor
Miami, FL 33147

DATE
March 25, 2025

ARCADIS PROJECT NUMBER
30189215

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ARCADIS CONTACT
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Purpose:

Provide a summary of best practices for effectively controlling odors at modern solid waste transfer stations, including odor causes, facility design considerations, operational practices, commercially available odor control technologies, and estimated costs.

Overview:

The basic purpose of solid waste transfer stations is to receive municipal solid waste (MSW) from collection vehicles, which typically carry about 7-9 tons of waste, and transfer that waste to truck trailers or intermodal containers that hold approximately 20-24 tons for road or rail transport to disposal facilities. To accomplish their purpose efficiently and minimize collection costs, transfer stations are usually located near collection routes to keep collection vehicle trips as short as possible and minimize the collection fleet and staffing needed. Unfortunately, this also typically places them near residential areas. Transfer station operations generate traffic, noise, dust, and odors, any of which can lead to complaints from residents if not properly controlled through facility design and operations.

Modern solid waste transfer stations employ a variety of methods to control the objectionable aspects of their operations and make them better neighbors. Some new designs, such as the Pomona Valley Transfer Station (see **Fig.1**) are intended not to look like a conventional transfer facility. This memo addresses only those methods used to control odors in transfer stations, and includes the following sections:

- Odor Generation
- Facility Design Considerations
- Operational Controls
- Odor Control Systems
- Conclusions

Fig.1. Pomona Valley Transfer Station, Pomona, CA. (Photo Courtesy JRMA)

Odor Generation

Although extensive research has been conducted over the years on landfill gas odors, very little has been directed at understanding MSW odor generation from the point of collection to arrival at the disposal facility, where transfer stations encounter the collected waste. However, research on the effective control of odors in many different industrial operations (i.e., solid waste, wastewater treatment, food processing, etc.) has been advancing for more than 25 years, and Miami-Dade County can benefit from the experience already gained by those industries.

Odors are mixtures of compounds resulting from chemical reactions occurring during biological decomposition of organic material under reducing (anaerobic) conditions. Such conditions often occur in solid waste collection, transport, transfer, and disposal operations and facilities, and more than 300 odorous compounds are known to be associated with solid waste operations. Many of these odorous compounds are detectable to humans at very low concentrations, some lower than one part per billion, which highlights the need for effective odor control at all solid waste facilities and operations. The type and intensity of odorous compounds depends on several factors, including waste composition, residence time, oxygen levels, and temperature. Older wastes with higher organic content and in warm, anaerobic conditions generally produce more odors. Younger, recently collected wastes generally are less odorous, because the odor-causing bacteria have likely not had sufficient time or anaerobic conditions to begin decomposing the entrained organic materials.

The decomposition process begins when solid waste is placed in a cart by a resident. By the time that waste is placed at the curb for pickup by a collection vehicle, it may already be several days into the decomposition process and starting to emit odorous gases. The collection truck then takes the waste to the transfer station, where it is combined with other wastes of approximately the same age on the tipping floor. The waste decomposition processes continue in the transfer station, and the longer the waste residence time, the more odorous gases will be emitted. Also, it should be noted that biological decomposition processes and gas emissions are accelerated with increasing temperatures, which for Miami-Dade increases the need to minimize waste residence time.

There are only a few decomposition gases that are responsible for the most objectionable odors, consisting primarily of hydrogen sulfide, dimethyl sulfide, and mercaptans. In addition, odor-causing compounds may condense on dust particles generated by the handling of wastes, which can also contribute to odor generation at transfer stations. Effective control of decomposition gases and dust are key elements in the design and operation of transfer stations, which are discussed in the sections that follow.

Facility Design Considerations

Modern transfer stations employ a variety of design features to control odors, but most are centered around minimizing the waste residence time and controlling airflows throughout the facility. Below are some of the design elements found in newer transfer stations:

- **Automatic Doors** – Minimizing the number of openings in the transfer station reduces the air volume that can escape uncontrolled. Automatic fast doors on the tipping floor entry and exit openings help to reduce the air volume that might escape during operations if no negative ventilation pressure is applied.
- **Additional Tipping Floor Space** – Designing the tipping floor with additional maneuvering area around the expected waste pile allows for easier transfer station operation while keeping exterior doors closed. This also provides for a safer operation by separating the maneuvering area for the transfer station wheel loader from inbound and outbound truck traffic.

- **Negative Pressure** – All buildings are required to have ventilation systems that replace the air volume inside the building several times per hour. However, designing the ventilation system to pull the air in from exterior openings and exhaust through a roof vent or other point effectively prevents the uncontrolled release of odorous gases. Such systems typically employ an activated carbon or biofiltration system on the exhaust points to eliminate odor compounds and dust in the exhaust air volume. While negative pressure systems are effective, they are not widely used in transfer stations due to their high capital and operational costs.
- **Air Curtains** – Industrial air curtains are mechanical airflow systems that provide an air seal at openings such as roll doors. The systems pull air into one side, accelerate it, and discharge it along the length of the unit through a plenum, forming a thin jet of air that is directed inside the building. Air curtains are often equipped with sensors to automatically activate when the door is opened.
- **Odor Control Systems** – There are many types of odor control systems used in transfer stations, but two main types, misting systems and vapor-mist systems are the most commonly used. Misting systems use a combination of water and chemicals, while vapor-mist systems use only chemicals. These systems are described in more detail below.

Operational Controls

The generation of objectionable odors is inevitable in solid waste transfer station operations. In order to minimize complaints from neighboring communities and avoid compliance issues with regulators, transfer stations must be operated to minimize the conditions that lead to odor generation.

Some of the best practices used in the industry to accomplish this include the following:

- Keep doors closed – retain generated odors within the facility as much as possible.
- Regular facility cleaning – regularly removing debris and washing the tipping floor, pushwalls, chutes, compactors, and other surfaces that contact and accumulate waste.
- Rapid waste turnover - clearing all waste from the facility within 24-48 hours of receipt ensures that the waste is as young as possible, and the moving and loading activities help reduce anaerobic conditions.
- Performing all truck cleanouts inside the facility.
- Operating the facility under negative pressure, as described above.
- Using odor control equipment, if necessary. However, the addition of odor control systems increase the capital and operating costs of a transfer station. A further discussion of odor control systems is presented in the following section.

Odor Control Systems

Some transfer stations have difficulty controlling odors even with strict operational controls. These facilities may require an odor control system to effectively control the generation and release of odorous compounds.

Odor compounds are generated at various locations within transfer stations, released into the air as a vapor, and can be transported over long distances by natural or artificial air movements to a human receptor where they may or may not be detected. Odor transport from transfer stations can be affected by several factors, including facility design, site topography, predominant wind direction, proximity to receptor populations, humidity, and others. Most odor control systems target odor transport and detection pathways by controlling air movement around and within the facility and use three general methods to control odorous compounds - physical, chemical, and biological, which are briefly summarized below.

Physical Controls

Physical odor controls are designed to contain and capture odors, and include the following:

- Containment systems - doors, covers, enclosures, and other systems that keep odor compounds in specific areas.
- Filtration systems – these systems use activated carbon filters or biofilters to remove particulates and adsorb odorous compounds from air drawn from inside the transfer station and can be used with other odor controls.
- Dispersion controls – these systems use ventilation to dilute the air volume and prevent the concentration of odorous compounds in a particular area.

Chemical Controls

Chemical odor controls are designed to cover, break down or neutralize odorous compounds, and include the following:

- Masking Agents – use of fragrances to cover odorous compounds, changing the detected odor to a more pleasing smell.
- Oxidizing Agents – use of chemicals like ozone or hydrogen peroxide to oxidize odorous compounds, changing their chemical composition.
- Neutralizing Agents – use of specifically formulated chemicals that bind with odorous compounds and render them undetectable. A brief explanation of the science behind molecular odor neutralization is helpful to understanding its effectiveness. Many odorous gases are comprised of polar molecules with an uneven distribution of electrical charges, resulting in slight positive and negative charges on either end. Neutralizers are specifically formulated to adsorb onto odorous molecules such as hydrogen sulfide and mercaptans, fully enveloping the molecule and preventing it from interacting with olfactory receptors in the human nose and eliminating an unpleasant odor detection. Through these chemical interactions, industrial odor neutralizers significantly reduce unpleasant odors in industrial settings.

  The effectiveness of an odor neutralizer depends on its ability to establish strong binding interactions with the specific odor molecules present. The careful selection of neutralizers specific to various industrial applications is critical to achieving the best results.
- Scrubbers - these systems use mixtures of water and chemicals to remove odor compounds from a supplied airflow.

Biological Controls

Biological odor controls employ microorganisms to remove odor compounds from air through natural processes, and are used in biofilters, scrubbers, and misting systems.

Application

Liquid solutions such as masking agents, neutralizers, and biological additives are typically applied through either fixed or portable misting systems and vapor-mist systems, which are described as follows:

- **Misting Systems** – Misting systems usually consist of hoses or piping and nozzles mounted above the tipping floor that continuously spray a fine (~10-micron) mist of water and/or chemical or biological additives to control odorous compounds (see **Fig. 2**). Such misting systems also effectively control dust within the building, which helps further reduce odors. Some additive products, such as Ecosorb® and Odor Armor®, consist of specialized sulfate-reducing bacteria that can help break down hydrogen sulfide and other sulfur-containing organic compounds, including mercaptans and dimethyl sulfide.

Fig.2. Transfer Station with Misting System (Photo Courtesy Benzaco Scientific)

- **Vapor-Mist Systems** – These systems are similar to misting systems, but they use a piping system typically made of 4-inch perforated HDPE pipes that distributes air entrained with an odor control chemical or neutralizer in vapor phase without the use of water. The fine vapor mist effectively reduces odors and dusts, and while they incur higher capital costs, they have lower operating and maintenance costs.
- **Portable Systems** – these are drum-mounted, portable misting systems that can use water and deodorizer chemicals or other additives and can be positioned at specific points in the transfer station where odors may be generated (i.e., ventilation exhausts, tipping floor, door openings, etc.)

Industry Experience

Controlling odors in solid waste facilities is a continuous challenge and can have many negative public and regulatory effects if not done effectively and consistently. As mentioned previously, odors from solid waste arriving at transfer stations are the result of chemical reactions occurring in the waste during biological decomposition of organic material and can be detected by humans at very low concentrations. For transfer stations that need an odor control system, selecting the right application system and chemicals to control their specific odor compounds is critical to successful odor management.

There are many odor control systems and products commercially available. Commonly used odor control methods introduce a masking agent to cover objectionable odors with fragrances, but they do not consistently work well and can adversely affect air quality. Municipalities and companies that own and operate industrial facilities that generate intensely odorous gases (i.e., transfer stations, landfills, food processing facilities, wastewater treatment plants, etc.) have found that vapor-mist molecular odor neutralization is one of the most effective odor controls.

Transfer stations that effectively control odors and experience minimal complaints from the public are designed to contain odors and actively control air movements, use operational best practices to minimize the generation and transport of odorous compounds, and employ the proven best performing odor control systems, such as molecular odor neutralization using plant-based products applied through high pressure vapor-mist systems. Any

new transfer station proposed for development in Miami-Dade County that is properly designed and consistently uses these odor control methods, which have been tested and proven successful in transfer stations around the country and in the most challenging industrial odor situations, will effectively control odors and be a good neighbor to nearby residents and businesses.

Cost Considerations

There are many variables that can significantly affect the capital costs of solid waste transfer stations, including land acquisition, utilities, capacity, station design, and others. Capital costs can range from a few million dollars for simple, small-capacity transfer stations with little or no odor controls, to more than $50 million for high-capacity versions equipped with advanced odor control systems. Estimated capital and operational costs for some of the controls discussed above are as follows:

- Automatic doors – High speed overhead doors for standard truck openings can cost approximately $40,000 or more, and a transfer station would have multiple overhead doors. Annual operational costs for each high speed overhead door are generally low as they are constructed of durable materials and engineered for heavy usage. However, these doors can be easily damaged by trucks or equipment traffic and should be protected by heavy bollards or other similar measures.
- Additional tipping floor space increases the size of the building and can increase the capital and operational costs significantly depending on the amount of increased tipping floor area.
- Negative pressure – this option requires substantial mechanical infrastructure and is expensive, and can add millions in capital costs depending on the design. Annual operating costs are high due to electrical demand, maintenance of mechanical systems and air exhaust treatment systems such as biofilters, carbon stacks, etc.
- Air curtains – These systems add approximately $50,000 - $60,000 in capital costs per structure opening. Operational costs are high due to electrical demand and maintenance requirements.
- Odor control systems – misting systems and vapor-mist systems add $50,000 or more to capital costs depending on the area covered and system configuration. For either system, operational costs are high due to electrical demand, water usage (for misting systems), maintenance, and chemical usage.

Sources

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3. *Natural Neutralizers are the Key Ingredient for Safe and Effective Odor Control*. Food Engineering, Glenn Crisler, published July 11, 2024. https://www.foodengineeringmag.com/articles/102299-natural-neutralizers-are-the-key-ingredient-for-safe-and-effective-odor-control
4. *Odor Control Compendium*. Waste Management, January 2014.
5. *The Science Behind Odor Control Systems*. Webster Environmental Associates, Inc., Online at odor.net.
6. *Odor Control Technology Solutions Analysis & Recommendations, North Transfer Station Odor Evaluation*. Jacobs Solutions, Inc., Technical Memorandum, July 11, 2024

ATTACHMENT 11

Directive 250222: Update on Closed Loop Recycling at MIA and PortMiami

Memorandum

MIAMI-DADE COUNTY

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on a Closed Loop Recycling Plan at Miami Dade Aviation Department and PortMiami - Directive No. 250222

Executive Summary

This report is provided pursuant to Resolution No. R-193-25 ("Resolution") sponsored by Commissioner Raquel Regalado and adopted by the Board of County Commissioners ("Board") on February 19, 2025. This Resolution directed the Mayor or Mayor's designee to prepare a report detailing a plan to explore, evaluate, and develop a closed loop recycling system for Miami Dade Aviation Department ("MDAD") and PortMiami. This report was intended to identify cost-effective methods for recycling and composting, possible funding sources (including any applicable grants) for the implementation of a closed loop recycling plan, and potential markets for recycled materials.

The Department of Solid Waste Management ("DSWM") coordinated with both MDAD and PortMiami to provide a consolidated report in response to this directive, outlining the challenges associated with developing a closed-loop recycling plan at Miami International Airport ("MIA"). Given the nature of the waste generated and the customer base served by DSWM and PortMiami, implementing a closed-loop recycling system is not feasible at this time; however, we anticipate receiving additional guidance on developing such a system from the County's Zero Waste Master Plan ("ZWMP") consultant, WSP. This report also details the current waste diversion efforts that are ongoing at MIA that are separate from any recommendations provided by any consultancy firm.

Background

The DSWM provides garbage and recycling collection services to over 350,000 residential accounts and more than 1,000 commercial accounts. DSWM does not provide recycling or garbage collection services to either MDAD or PortMiami. Nonetheless, DSWM has a vested interest in supporting the development of a closed-loop recycling plan at both MIA and PortMiami to minimize the production and use of raw materials and to promote waste diversion, two goals that align with the goals of the ZWMP. A major focus of the ZWMP is to identify County facilities that generate waste and have the potential for waste diversion.

MIA generates a significant amount of waste from its general airport operations and has opportunities for waste diversion. Potential next steps to achieve these opportunities for waste diversion at MIA include:

- Study whether a single stream recycling compactor could be installed at MIA;
- Improve bin design and signage to reduce contamination and increase recycling recovery; and

- Complete the development of a new recycling program which will require concessionaire participation.

More information is available in the attached report provided by MDAD (Exhibit 11.1).

On April 11, 2025, DSWM and its ZWMP consultant, WSP, met with MDAD to discuss strategies for ongoing waste diversion efforts. WSP recommended conducting basic bin audits to evaluate the types of materials being discarded at MIA and to assess the effectiveness of current recycling programs, particularly in public-facing areas of the airport. WSP also brought in subject matter experts from their consultancy firm with experience in international airport waste diversion to provide insights and inform the development of MDAD's recycling strategies.

PortMiami is not responsible for the waste generated from cruise liners, which would be the predominant source of waste generation for their operations. Due to federal regulations governing international waste, cruise liner waste must be incinerated. PortMiami's responsibility is limited to the waste generated in its administrative offices and cruise terminals. Since the port does not have concessionaires, the volume of waste generated in these terminals is minimal.

Conclusion

The challenges with developing a closed loop recycling plan in MIA are expressed in the Report provided by MDAD (Exhibit 11.1). Constraints surrounding space, operations, and recycling collection pose challenges for deploying a fully closed-loop system at MIA. Despite these challenges, DSWM will continue to engage MDAD, PortMiami, and those departments that have influence on the County's waste stream and play a role in waste diversion as development of the ZWMP progresses.

These ongoing efforts by DSWM and WSP are critical to ensuring that the ZWMP is an effective plan that will put the County on track to becoming a zero-waste county while aligning with the goals of our community and stakeholders like MDAD and PortMiami.

Aside from the efforts of MDAD's Consultant, Jacobs, and the ZWMP consultant, WSP, MIA has been working on several waste diversion solutions. For example, MIA is proceeding with providing liquid deposit containers at security checkpoints to allow passengers to empty drinking bottles before passing through security. The intent of these liquid deposit containers is to allow empty bottles to be recycled upon passing through security. MIA continues to evaluate other solutions that promote the goals of waste minimization and waste diversion.

In accordance with Ordinance No. 14-65, this report will be placed on the next available Board meeting agenda, without committee review. If additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

Attachment:
Exhibit 11.1 – Closed Loop Recycling Strategy Response

c: Geri Bonzon-Keenan, County Attorney
Gerald Sanchez, First Assistant County Attorney
Jess McCarty, Executive Assistant County Attorney
Office of the Mayor Senior Staff
Aneisha Daniel, PhD, Director, Department of Solid Waste Management
Yinka Majekodunmi, Commission Auditor
Basia Pruna, Director, Clerk of the Board
Eugene Love, Agenda Coordinator
Office of Policy and Budgetary Affairs

EXHIBIT 11.1

Closed Loop Recycling Strategy Response to Resolution R-193-25

MIAMI INTERNATIONAL AIRPORT™

Miami-Dade Aviation Department
4200 Northwest 36 Street
Miami, FL 33166

Prepared by

Jacobs

In association with

Nova Consulting

May 30, 2025

Table of Contents

Executive Summary

This technical memorandum responds to Miami-Dade County Resolution R-193-25, which directed the Miami-Dade Aviation Department (MDAD) to assess the feasibility of a closed-loop recycling system at Miami International Airport (MIA). While achieving a fully closed-loop system presents challenges in an environment as complex as an international airport, there are opportunities for MDAD to enhance material recovery, reduce operational costs, and align with the County's broader Zero Waste goals. This memorandum addresses five key directives from the resolution.

i. Investigate more cost-effective methods of recycling and composting;
ii. Investigate additional potential markets for recycled items or materials that could prove cost-effective;
iii. Identify legally available funding source(s) to pay any costs associated with the construction, implementation and operation of the closed loop recycling plan;
iv. Investigate the existence of state or federal grant opportunities that may be available for such purposes; and
v. Determine whether the current MDAD recycling contract can be used for these purposes

i. Investigate more cost-effective methods of recycling and composting

MDAD's current recycling system is managed under Miami-Dade County's countywide recycling services contract and is based on scheduled pickups of carts and dumpsters, with pricing determined per lift. This structure is inflexible and costly. A financial analysis demonstrates that the introduction of a single recycling compactor could reduce costs by 37 to 42 percent over five years, depending on how it is used. However, installing a compactor within an operating airfield is not as simple as placing new equipment. Further study is required to determine whether space, access, and airfield operations allow for this type of equipment placement. In secure or constrained areas, service reduction or container consolidation may not be possible due to airfield safety, staffing, or scheduling requirements.

Recyclables Collection - Gate D-21

Composting is not currently active at MIA and is limited by tenant lease agreements that do not require food waste separation. While composting may have long-term potential, it will require targeted tenant engagement, infrastructure upgrades, and contractual changes.

ii. Investigate additional potential markets for recycled items or materials that could prove cost-effective

MDAD diverts over 2,000 tons of recyclable material annually, with cardboard representing the most consistent and high-value stream. However, under the current Miami-Dade County recycling services contract, Waste Management retains ownership of all recyclables and associated commodity value. MDAD receives no financial return from this material. Future contract terms could introduce performance-based pricing, rebates, or revenue sharing to encourage better separation and higher quality material recovery. Infrastructure changes, such as improved bin design and signage, could also reduce contamination from other trash and increase recovery rates.

iii. Identify legally available funding sources to support the construction, implementation, and operation of a closed-loop system

MDAD has access to several funding sources:

- Federal FAA funding through the Airport Improvement Program (AIP) can support capital infrastructure like compactors or staging areas.

- State-level support is available through the Florida Department of Transportation (FDOT) aviation grant program.
- MDAD's own capital budget may be used for recycling improvements that align with its sustainability goals and demonstrate a return on investment.

iv. Investigate the existence of state or federal grant opportunities

Additional grant programs can help fund infrastructure, education, and innovation.

These include:

- EPA's Solid Waste Infrastructure for Recycling (SWIFR) program
- USDA grants for technical assistance and composting pilots
- Urban Agriculture and Environmental Justice programs focused on food waste, education, or community engagement

Most of these programs are competitive and may require MDAD to partner with local nonprofits or other jurisdictions to be eligible.

v. Determine whether the current MDAD recycling contract can be used for these purposes

The current Miami-Dade County countywide recycling contract allows limited administrative flexibility. MDAD can reduce service frequency, consolidate some containers, and explore compactor use without a formal amendment. However, greater improvements are constrained by the contract structure. Recycling and trash services are managed under separate contracts, by different departments, despite being handled by the same vendor. This separation creates inefficiencies in coordination, cost tracking, and operational oversight.

Tenant and concessionaire waste practices add another layer of complexity. A recycling program is planned at MIA to include the participation of all airport concessionaires. Participation in this program, once established, will be mandatory.

Phased Implementation Strategy

The report outlines a three-phase approach to help MDAD make measurable progress while preparing for longer-term improvements:

Short-Term:

- Study the feasibility of compactors in high-volume locations
- Appoint a Recycling and Waste Systems Champion
- Conduct a full waste systems mapping exercise
- Continue benchmarking practices from peer airports

Mid-Term:

- Align recycling expectations with vendor and lease agreements
- Explore expanded infrastructure based on initial findings
- Develop a simple dashboard to track contamination, costs, and volumes
- Investigate targeted composting initiatives

Long-Term:

- Consider combining recycling and trash contracts
- Pursue contract language that rewards high-quality recycling
- Publish an annual waste impact report
- Continue aligning with the County's Zero Waste Master Plan

Conclusion

A fully closed-loop recycling system is not currently achievable at MIA due to significant operational, contractual, and physical constraints. Recycling and trash are managed under separate contracts, and tenant waste practices are largely governed by long-term lease agreements that mandate participation in recycling programs once MDAD develops a concessionaires specific recycling plan. Limited space, especially in airside areas, and strict airfield security requirements further complicate changes to waste handling practices.

Despite these challenges, MDAD can take key initial steps to improve efficiency and lay the groundwork for long-term improvements. Actions such as the creation of a concessionaires specific recycling plan so that MDAD's concessionaires can follow (and MDAD can enforce) the recycling stipulations in Section 8.05 of their respective lease agreements. In addition, assessing the feasibility of compactors in high-volume areas, mapping all waste flows across the airport, and strengthening internal leadership will create a foundation for better coordination and cost control. These efforts also position MDAD to pursue funding opportunities and make data-informed decisions about future infrastructure and contract strategies.

Over time, MDAD can use these early actions to align its waste management system with Miami-Dade County's broader zero waste goals. Success will require strong partnerships with County agencies, tenants, vendors, and community stakeholders. With a phased approach, focused leadership, and ongoing collaboration, MDAD has the opportunity to make steady, measurable progress and continue to demonstrate leadership in sustainable airport operations.

Acronyms and Abbreviations

ACIP	Airport Capital Improvement Plan
ADO	FAA Aiports District Office
AIP	Airport Improvement Program
ATL	Hartsfield-Jackson Atlanta International Airport
DEN	Denver International Airport
EPA	US Environmental Protection Agency
FAA	Federal Aviation Administration
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FLL	Fort Lauderdale – Hollywood International Airport
IIJA	Infrastructure Investment and Jobs Act
ISO	International Organization for Standardization
LAX	Los Angeles International Airport
MCO	Orlando International Airport
MDAD	Miami-Dade Aviation Department
MIA	Miami International Airport
NOVA	Nova Consulting, Inc.
OUAIP	USDA Office of Urban Agriculture and Innovative Production
PET	Polyethylene Terephthalate
PFC	Passenger Facility Charges
SAN	San Diego International Airport
SFO	San Francisco International Airport
SNA	John Wayne Airport
SWIFR	Solid Waste Infrastructure for Recycling (EPA Program)
TPA	Tampa International Airport
USDA	U.S. Department of Agriculture
WSP	WSP Global Inc. (Engineering and Planning Consultant)
WM	Waste Management Inc. of Florida

Assumptions and Limitations

This memorandum was developed under a compressed timeline in response to Miami-Dade County Resolution R-193-25 and reflects the best available information as of April 2025. The analysis draws on a combination of existing documentation and new observations, including:

- A detailed review of MDAD's executed solicitation package (EVN0000418) and the active recycling services contract with Waste Management Inc. of Florida
- A site visit conducted at Miami International Airport on April 5, 2025
- Four coordination sessions held with staff from MDAD, WSP, and Waste Management
- Historical recycling and service data provided by MDAD and its contractors
- The Team's prior experience with solid waste systems at peer airports

This report includes original financial modeling based on the pricing structure and equipment types defined in the existing contract. However, some estimates were informed by historical assumptions and observed operational conditions in the absence of a current full waste characterization study. While every effort was made to align the cost modeling with real-world conditions at MIA, these estimates should be validated with actual operational data where feasible.

Recommendations related to grant and funding opportunities reflect current guidance from federal and state sources as of Q1 2025. Given the evolving nature of these programs, Nova Consulting and Jacobs cannot assume responsibility for termination of these opportunities.

This study is intended to provide a high-level strategic framework. Implementation steps and priorities should be revisited and refined as baseline data is collected and as stakeholder input continues to evolve.

MDC255

1. Introduction and Background

This document responds to Miami-Dade County Resolution R-193-25 by outlining the scope, approach, and findings of the analysis conducted for MDAD's recycling operations at MIA and their potential alignment with a closed-loop recycling system. In the following sections, the five key questions outlined in Resolution R-193-25 are addressed:

1. Investigating more cost-effective methods of recycling and composting;
2. Investigating additional potential markets for recycled items or materials that could prove cost-effective;
3. Identifying legally available funding source(s) to pay any costs associated with the construction, implementation and operation of the closed loop recycling plan;
4. Investigating the existence of state or federal grant opportunities that may be available for such purposes; and
5. Determining whether the current MDAD recycling contract can be used for these purposes

The recommendations presented are grounded in cost modeling, peer benchmarking, and direct stakeholder engagement conducted by Jacobs and Nova beginning in March 2025. This document reflects the most current operational understanding and financial analysis as of April 2025. While a fully closed-loop recycling system may not be feasible to implement given the complexity of the airport environment and regulatory constraints, this study outlines an approach to investigate ways to reduce waste, improve efficiency, and make measurable progress toward the County's broader zero waste goals over time. Following the review of the five key questions outlined in Resolution R-193-25, the final section summarizes the recommended actions across initial, mid-term, and long-term phases.

Trash/Recycling Receptacles

Recycling at MIA is provided through a countywide contract managed by Miami-Dade County, with MIA operating as one of several service zones (Zone A). MDAD does not directly manage vendor selection or pricing. MDAD, however, manages the waste (trash) contract at MIA. Gaining full clarity on both recycling and waste service agreements is essential to support future investigations into system-wide improvements across all waste streams, not just recycling.

1.1 Definition of Closed Loop Recycling

Closed-loop recycling is a system in which recyclable materials are continuously collected, processed, and reused to manufacture the same or similar products, with minimal loss in material quality (Pennsylvania State University 2025). Unlike open-loop systems, where materials are eventually downcycled into lower-value products, a closed-loop approach preserves the integrity and value of recyclables and minimizes landfill dependency.

At an airport as complex as MIA, with hundreds of waste generation points and many independent operators, a fully circular system is difficult to achieve. However, an evaluation of the current system is recommended for MDAD to identify steps to improve recovery rates, streamline operations, and reduce costs, starting with infrastructure upgrades.

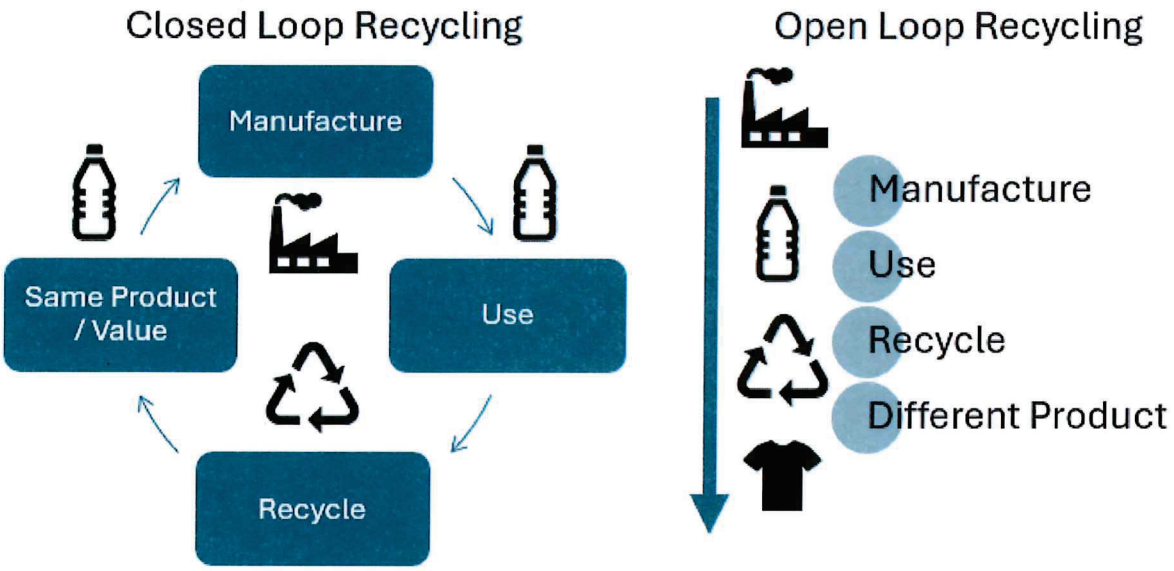


Figure 1. Closed Loop vs Open Loop Recycling

This initiative also aligns with the development of Miami-Dade County's Zero Waste Master Plan. MDAD's efforts to modernize terminal recycling infrastructure, improve material quality, and reduce service inefficiencies are critical building blocks in that broader transformation. While MDAD operates within a uniquely constrained airport environment, this study provides a practical pathway to align with the County's long-term zero waste vision.

1.2 Scope of Waste and Operational Focus

This study focuses on recyclable waste streams generated within passenger terminals and MDAD-controlled operational areas, including administrative offices, baggage handling areas, and public-facing curbside zones. It explicitly excludes:

- Airline-controlled waste, such as ramp and in-flight catering waste
- International waste, which must be incinerated
- Concessionaire back-of-house waste, which is managed independently under long-term lease agreements

Although MDAD does not control tenant and concessionaire waste handling at the source, it bears the operational and infrastructure costs associated with its disposal. These shared responsibilities create operational complexity, but they also offer opportunities to improve overall system efficiency through better coordination, infrastructure upgrades, and targeted incentives.

MDAD's custodial staff collects trash and recycle material throughout the day using wheeled carts. In contrast, concessionaires typically use 8-yard dumpsters and 96-gallon recycling totes. Video surveillance is deployed across waste docks to monitor usage, discourage illegal dumping, and promote correct recycling behavior.

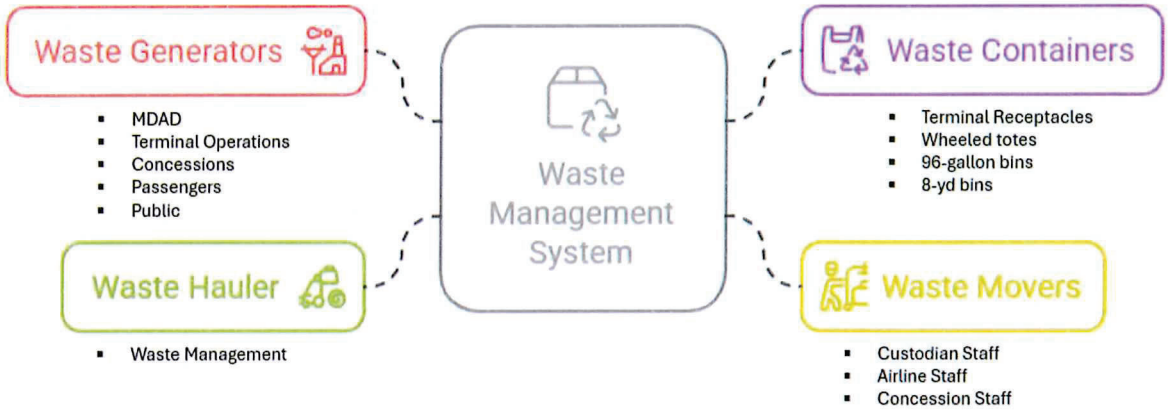


Figure 1 Waste Systems Overview

1.3 Assumptions on Waste Volume and Composition

Due to the compressed project timeline, a full on-site waste composition study was not feasible as part of this effort. However, based on our prior experience conducting waste system assessments at other airports including Los Angeles International (LAX), Palm Beach County Park Airport (LNA), Palm Beach County Glades Airport (PHK), & North Palm Beach County Airport (F45), as well as MDAD's historical reporting, we have established working assumptions that are appropriate for high-level planning and cost analysis.

To support high-level planning and cost modeling, historical recycling data provided by World Waste Recycling and Waste Management covering both cardboard and co-mingled recyclables (paper, bottles, and cans) from fiscal years 2009 through early 2025 were reviewed. While reported tonnages vary year to year based on operational conditions, container access, and reporting consistency, the data from the last three full calendar years: 2022, 2023, and 2024 provide the most relevant baseline for current operations (MDAD 2025b). Averaging these three years yields a total estimated recycling volume of 2,041 tons annually, which has been used as the basis for all cost, service, and compactor modeling scenarios included in this study.

While total diversion rates are calculated by comparing recycling volume to overall waste generation, the waste data from compactors and roll-off containers is managed under a separate contract. These volumes, while essential for calculating an accurate baseline diversion rate, were not available within the scope of this effort.

Despite this limitation, the airport's current recycling volume provides a strong foundation for evaluating cost and service optimization strategies. In the context of closed-loop systems, many airports are shifting toward zero waste as a more operationally grounded goal, recognizing the inherent difficulty of achieving a fully circular system in a complex, transient environment like MIA.

Strategic procurement policies, reusable packaging programs, and stronger collaboration with concessionaires and tenants accelerate closed-loop outcomes.

Progress toward closed-loop outcomes can be accelerated through strategic procurement policies, the adoption of reusable packaging programs, and stronger collaboration with concessionaires and tenants. Embedding waste reduction requirements into leases, standardizing back-of-house recycling, and appointing a designated recycling or zero waste champion within MDAD could help unify stakeholders under a shared vision and make meaningful progress toward

long-term diversion and sustainability targets that aligns with the County's zero waste initiatives as well. To further enhance operational efficiency, MDAD may coordinate with the Innovation & Customer Experience Office.

1.4 Industry Scan: Peer Airports

To inform MDAD's approach and ensure alignment with national and global trends, a targeted scan of best practices from peer airports that have implemented successful recycling and waste diversion strategies. Some airports in Florida, such as Fort Lauderdale-Hollywood International Airport (FLL), Orlando International Airport (MCO) and Tampa International Airport (TPA), were chosen due to their proximity to MIA, and the similar regulatory environments they face. Airports such as Los Angeles International (LAX), San Diego International (SAN), Hartsfield-Jackson Atlanta (ATL), San Francisco International (SFO), John Wayne Airport (SNA), and Denver International (DEN) offer replicable models, demonstrating the impact of compactor deployment, tenant engagement programs, on-site composting, and contractual incentives tied to diversion performance. These case studies were selected based on comparable operational complexity, and stakeholder challenges, and they serve as benchmarks for MIA's phased transition toward a closed-loop recycling model.

Table 1. Peer Airport Recycling and Diversion Practices

Airports	Closed Loop Program	Waste Sorting Strategies	Compactor Usage	Required Composting	Waste Diverted Annually
FLL	No formal program	Does not separate waste into landfill, recycling, organics.	No compactors present	No composting requirements	Unknown
MCO	No formal program	Separated into landfill and recycling. Single stream recycling	No compactors present	No composting requirements	23%
TPA	No formal program	Separated into landfill and recycling. Single stream recycling	No compactors present	No composting requirements	Diverted over 1,100 tons
LAX	Zero Waste Program launched in 2021	Separated into landfill, recycling, organics; Single stream recycling	Compactors in every terminal	All tenants required to compost	70%
ATL	Established Greening ATL in 2014, developing onsite recycling and composting facilities	Separated into landfill, recycling, organics; Single stream recycling	Compactors present	All tenants required to compost	Targeted 90% by 2035
SNA	No formal program	Separated into landfill, recycling, organics; Single stream recycling	Compactors present	All tenants required to compost	75%

Airports	Closed Loop Program	Waste Sorting Strategies	Compactor Usage	Required Composting	Waste Diverted Annually
SAN	Zero Waste Program launched in 2018	Separated into landfill, recycling, organics; separate recycling for cardboard and electronics	Compactors present	All tenants required to compost	87%
SFO	Began implementing Zero Waste Plan in 2016	Separated into landfill, recycling, organics; Single stream recycling	Compactors present	All tenants required to compost	83%
DEN	Pilot Program in Progress	Separated into landfill, recycling, organics; Single stream recycling	Compactors present	All tenants under pilot program required to compost	75% of waste in pilot program

As seen in the table above, other airports located in Florida (MCO, FLL, TPA) largely do not have formal zero waste or closed loop programs and therefore, have less information on waste management strategies available to the public. All of the Florida airports express a desire to divert waste and decrease waste disposal costs, so there is growing interest and support within the state. In this regard, MIA could emerge as a leader within the state by implementing strategies from other airports. The airports surveyed outside of Florida have much in common in regard to how they manage waste and recycling within their terminals. Utilizing compactors or requiring all tenants to compost represent best practices that MDAD can learn from.

2. Resolution R-193-25 (i): Investigating more cost-effective methods of recycling and composting

To identify cost-effective strategies for improving waste management at MIA, it is first necessary to understand the full picture of the airport's waste stream. This includes not only the recycling currently collected in MDAD managed areas, but also the broader volume of landfill waste and the potential for future organics recovery. While this study primarily addresses recyclables, a more complete understanding of total waste generation is needed to evaluate long-term diversion strategies and optimize operations more effectively. A full waste characterization study would help establish the volume, composition, and flow of material across the airport and would provide the foundation for evaluating the different waste reduction strategies.

Composting should be revisited in a future phase of this effort. While organics represent a potential area of impact, the ability to separate it (primarily concessions) is limited, pursuant to Section 8.05 of the concessionaire lease agreements, until MDAD develops a concessionaire specific recycling plan. Future opportunities exist to explore organics management through improved tenant engagement, reusable container programs, and bin-level tracking technologies.

This section evaluates MDAD's current recycling system and compares it to a compactor-based alternative to identify cost savings and operational efficiencies. It draws directly from the executed solicitation package (EVN0000418) and the existing recycling services contract with Waste Management, which governs current pickup frequencies, container types, and per-lift pricing. A custom cost model was developed to assess how infrastructure upgrades, particularly the use of compactors, could lower long-term costs and improve recycling efficiency.

2.1 Current Recycling Snapshot

Recycling at MIA is managed under a Miami-Dade County countywide recycling services contract, which includes 174 individual collection points across the airport. These consist of 129 96-gallon carts and 44 8-yard front-load containers. Waste Management of Florida, the County's contracted hauler, services these containers on a scheduled basis under a per-lift rate structure as defined in the countywide agreement

96-gal Recycling Cart

The annual volume of recyclable material has been estimated at 2,041 tons, based on a three-year average of reported data for 2022, 2023, and 2024 totals. As illustrated in Figure 3, the pie chart includes both cardboard (1149 tons) and commingled recyclables (892 tons of paper, cans, and bottles) and forms the basis for modeling current and future system costs. The contract pricing structure does not consider how full a container is at the time of pickup, and there are no built-in incentives for reducing lift frequency or improving diversion quality. As a result, the current system is labor and haul-intensive, especially in areas with smaller containers.

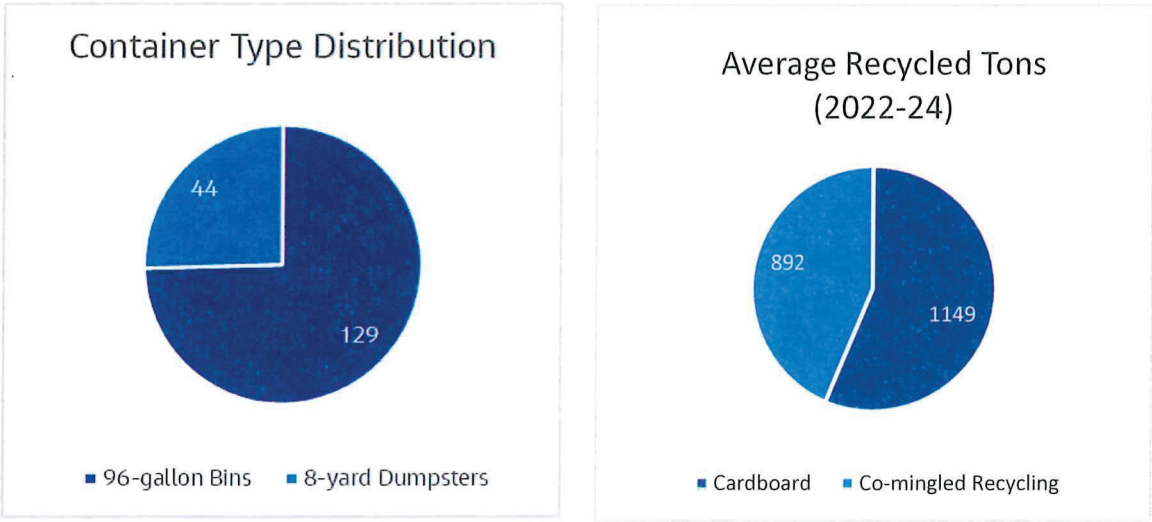


Figure 3. Current MDAD Recycling Container Types and Ton Proportions (Pie Chart)

2.2 Cost Comparison and Modeled Scenarios

To understand the potential financial benefits of installing a recycling compactor, the projected cost of continuing with the current recycling system was modeled over a five-year period. This baseline estimate of $4.56 million was developed using actual expenditures from the three most recent invoices (Nov 2024 to Mar 2025) under the existing Waste Management contract. An annual escalation of 4% was applied to reflect expected cost increases over time.

This baseline represents the status quo: the cost of maintaining current pickup frequencies, container types, and service models without any operational changes.

Table 2. Base Case Costs

Base Case		
	Cost	
Year 1	$	841,463
Year 2	$	875,122
Year 3	$	910,127
Year 4	$	946,532
Year 5	$	984,393
Total 5 Year Costs	$	4,557,636

This baseline was compared to a scenario in which a single RJ-250SC self-contained compactor is introduced. The compactor assumptions were based on field observations made during a site visit in April 2025. To capture the variability in waste density, we modeled two compactor performance scenarios:

- Worst case: 3 tons per pickup
- Best case: 6 tons per pickup

The scenario assumes that 30% of recycling volume is handled by a single compactor, with the remaining 70% continuing through existing carts and dumpsters. The model also assumes the compactor would be rented, although this cost is noted separately and could be reevaluated in future capital planning.

RJ-250SC self-contained compactor

Table 3. Compactor Scenarios – Five Year Costs

5 Year Costs		% Savings
Projected	$4,557,636	
3 Ton	$2,868,929	37%
6 Ton	$2,621,325	42%

The results show that installing a single compactor could reduce total recycling service costs by 37% to 42% over five years, depending on how efficiently the compactor is utilized. These findings suggest that compactors could offer significant cost savings, but further analysis is needed to assess where space, operations, and access allow for installation.

2.3 Key Considerations

This preliminary analysis of current operations and costs demonstrates that recycling compactors have the potential to reduce hauling costs, increase collection efficiency, and support long-term sustainability goals. Given the variability in operational conditions across the airport (i.e., space, access and airfield safety), it is recommended that MDAD perform a feasibility review of compactor deployment in high-volume recycling areas where space and logistics allow.

These early findings indicate that even limited adoption—starting with a single strategically placed recycling compactor unit—could serve as a cost-effective starting point for broader system improvements.

3. Resolution R-193-25 (ii): Investigating additional potential markets for recycled items or materials that could prove cost-effective

MDAD may have opportunities over time to offset costs or generate modest revenue through targeted engagement in secondary recycling markets. These markets reward clean, high-value, source-separated materials, but success depends heavily on how recyclables are collected, who owns them, and what terms are defined in service contracts.

Pending state legislation (HB 295 / SB 200, 2025 session) directs the Florida Department of Environmental Protection to develop a new statewide recycling and waste reduction plan. While still under development, this framework may introduce new diversion targets, data tracking requirements, and market development programs that could affect Miami-Dade County and MDAD operations. Planning for organics recovery and system-wide performance tracking now may better position MDAD to comply with, and benefit from, future state-level initiatives.

MDAD can better position itself to comply with and benefit from future state-level initiatives by planning for organics recovery and system-wide performance tracking now.

3.1 Cardboard and Mixed Paper

MDAD currently diverts over 1,000 tons of cardboard annually, making it the most consistent and valuable recyclable stream on-site. Clean, source-separated cardboard has positive value in the commodity market, especially when compacted or baled. While resale value is not currently captured under the existing contract, improved collection practices could position MDAD for direct contracting or rebate opportunities in future service models.

Amending the County's contract to offer lower rates for source-separated, high-quality materials, such as cardboard, could provide a meaningful incentive for improved diversion and is worth exploring in coordination with County contract managers.

3.2 Aluminum Cans and PET Plastics

Passenger terminals and food concessions are strong candidates for capturing aluminum cans and Polyethylene Terephthalate (PET) bottles, which retain high value and are widely traded in domestic markets. Aluminum, in particular, is one of the most profitable recyclable materials, especially when kept separate and uncontaminated.

MDAD can improve recovery by redesigning bins e.g., using round openings for cans and bottles and prominent labeling to guide behavior. These upgrades could be supported by MIA's innovation team, who are actively deploying digital signage and customer engagement tools. Interactive QR signage or chatbot-enabled education campaigns could increase passenger participation and reduce contamination.

3.3 Organics

Organics recycling, including food scraps from concessions and staff areas, represents a longer-term opportunity. While MDAD is not ready to launch a full-scale program, small-scale back-of-house pilots could be tested in partnership with selected tenants. Over time, material could be processed on-site or

routed to local organic processing facilities, with potential cost savings tied to reduced landfill volumes or marketing of the material (anaerobic digestion or animal feed).

3.4 Key Considerations

Under the current Miami-Dade County recycling services contract, Waste Management retains ownership of all recyclables and associated commodity value; therefore, MDAD receives no financial return from this material. Future contract terms could introduce performance-based pricing, rebates, or revenue sharing to encourage better separation and higher quality material recovery.

Although MDAD does not currently receive revenue for recyclables and does not control how tenants manage waste within their leased areas, the department is still responsible for covering the disposal costs of that material. This disconnect between control and responsibility presents both a challenge and an opportunity. The deployment of recycling compactors, where space and operations permit, offers a practical entry point for engaging Waste Management in discussions about increasing diversion rates and exploring future revenue-sharing opportunities.

Recyclables Collection - Gate D-31

4. Resolution R-193-25 (iii): Identifying legally available funding source(s) to pay any costs associated with the construction, implementation and operation of the closed loop recycling plan

This section builds on information provided by the MDAD Aviation Department and expands upon it with a more detailed review of applicable funding programs, grant opportunities, and strategic considerations for implementation.

Transitioning MIA's recycling system toward a more efficient, closed-loop model will require upfront capital investment, particularly for infrastructure such as compactors, new bins, signage, and staff training. Fortunately, there are multiple legally available funding sources that MDAD can pursue to support these improvements.

These sources fall into three primary categories: federal aviation grants, state-level transportation funds, and airport-generated revenue streams. Below is a summary of the most viable options MDAD can consider in both the near- and medium-term.

It is worth noting, however, that the current public funding landscape is in flux. As of April 2025, many federal grant programs are experiencing delays due to the 90-day freeze on disbursements, agency staffing changes, and political efforts to scale back or review certain funding streams. While these issues have primarily affected federal grants, similar delays or adjustments may also impact state-administered or other public funding programs referenced in this document. Although all opportunities outlined in this section and section 5 remain legally available, they should be closely monitored for potential changes in timing, availability, or scope as the broader policy and funding environment continues to evolve.

4.1 Federal Aviation Funding – Airport Improvement Program (AIP)

The FAA's Airport Improvement Program (AIP) is a well-established source of infrastructure funding for federally obligated airports like MIA. The FAA explicitly allows airport sponsors to use AIP funds for waste reduction and recycling infrastructure as long as the project:

- Improves the efficiency or environmental performance of the airport;
- Supports long-term master planning goals;
- Does not include ongoing operational expenses (i.e., funding is for capital only);
- Scope aligns with the current version of Guidance on Airport Recycling, Reuse, and Waste Reduction Plans.

To maximize AIP eligibility, it is recommended that MDAD prioritize integrating recycling-related infrastructure and equipment into larger terminal improvement projects or master planning updates. MDAD may be eligible to use AIP funds for capital purchases such as:

- Stationary or self-contained recycling compactors, if permanently installed as part of a capital project that improves airport efficiency or environmental performance.
- Designated recycling enclosures or staging areas. Permanent, enclosed spaces for sorting or storing recyclables in back-of-house or airside locations are AIP-eligible as part of terminal infrastructure.
- Recycling container systems, as part of terminal improvement projects.
- Planning efforts to evaluate closed-loop systems, contamination reduction, or recycling capacity.

Projects must be included in the airport's Airport Capital Improvement Plan (ACIP) and coordinated with the local FAA Airports District Office (ADO). AIP cannot fund education, staffing, or general operating costs, but

it can cover hard infrastructure, which aligns well with MDAD's compactors and container consolidation goals.

The AIP program is not currently expected to face long-term disruptions. Broader grant processing timelines may still be affected as agencies work through the resulting backlog and administrative delays.

4.1.1 Other Related Projects

Below are some examples of waste management and recycling projects at airports that have been funded through the FAA's Airport Improvement Program (AIP).

1. Concord-Padgett Regional Airport (JQF) – Recycling, Reuse, and Waste Reduction Plan

   As part of its master plan update, JQF developed a comprehensive recycling, reuse, and waste reduction plan. This initiative, aligned with FAA guidance, assessed the feasibility of solid waste recycling, strategies to minimize waste generation, and potential cost savings. The plan was funded through AIP and serves as a model for integrating sustainability into airport planning.

2. Colville Municipal Airport (63S) – Airport Recycling, Reuse, and Waste Reduction Plan

   Colville Municipal Airport prepared a recycling, reuse, and waste reduction plan to enhance its waste minimization efforts and comply with FAA requirements. The plan addressed the feasibility of recycling, strategies to minimize waste generation, and reviewed waste management contracts, aligning with AIP funding criteria.

3. Kanab Municipal Airport (KNB) – Airport Recycling, Reuse, and Waste Reduction Plan

   KNB developed a recycling, reuse, and waste reduction plan as part of its master planning process. The plan evaluated the feasibility of recycling programs, strategies to minimize solid waste, and reviewed operational requirements, aligning with FAA's AIP funding guidelines.

4.2 State and Local Aviation Funding – FDOT Aviation Program

The Florida Department of Transportation (FDOT) maintains an aviation grant program that supports commercial airports with capital investment needs. While the FDOT Aviation Grant Program does not specifically target recycling or composting projects, it can fund capital projects on airport property that align with environmental and operational improvements. Potentially eligible activities related to a closed-loop recycling or composting program at MIA could include:

- Recycling-focused facility improvements, such as permanent sorting or storage areas on airport property;
- Signage programs, as part of infrastructure upgrades;
- Pilot projects, including waste dock retrofits or fixed compactors in food court areas;
- Technology to support data tracking, monitoring, and contamination control for operational optimization;
- Construction of recycling, or composting facilities on airport property;
- Development of environmental management plans that incorporate waste reduction strategies.

FDOT funding may also be used to support public-facing sustainability initiatives, including those that contribute to statewide climate or waste diversion goals. These programs are competitive and require application during designated cycles, but MDAD has historically been a successful applicant.

4.3 Airport Generated Revenue

As a self-sustaining enterprise fund, MDAD may also use its own capital resources, drawn from passenger facility charges (PFCs), landing fees, and airline fees, for eligible infrastructure improvements that enhance operational efficiency or environmental compliance.

While MDAD has discretion in how it allocates its internal capital budget, expenditures must:

- Align with the airport's existing sustainability goals and ISO 14001 commitments;
- Demonstrate a return on investment;
- Not conflict with FAA revenue use regulations.

Further investigation is required to confirm that recycling compactors where space and operations permits would qualify as a capital improvement. An initial review suggests they would provide operational payback and thus, could be funded from MDAD's internal budget.

5. Resolution R-193-25 (iv): Investigating the existence of state or federal grant opportunities that may be available for such purposes

In addition to traditional funding sources such as FAA's AIP program and state-level aviation funds, MDAD may also be eligible for non-aviation-specific environmental grants that support waste diversion, recycling infrastructure, and climate resiliency. These programs are especially relevant for capital investments that reduce landfill dependency, improve resource recovery, and enhance environmental performance.

As with all public funding programs, it is important to note that competitive and discretionary grants are subject to change based on agency priorities, political shifts, and budget conditions. While the programs outlined in this section are currently active or anticipated, some may experience delays, reduced funding, or shifting eligibility criteria, particularly in the wake of recent federal funding disruptions and broader uncertainty in the public grant landscape. MDAD should continue to monitor these opportunities closely and remain flexible in project planning to accommodate any changes in program scope or timing.

1. The **Solid Waste Infrastructure for Recycling (SWIFR) Grant Program**, administered by the U.S. Environmental Protection Agency (EPA), was created under the Save Our Seas 2.0 Act and funded through the Infrastructure Investment and Jobs Act (IIJA). With over $100 million available nationally, SWIFR targets local governments, political subdivisions (such as MDAD), and tribal communities seeking to improve recycling and materials management systems. $58 million is the total estimated funding available for the political subdivision grants.

   Eligible activities include:

   - Purchasing and installing recycling infrastructure, such as compactors and collection containers;
   - Improvements to recycling logistics and data tracking;
   - Equipment for reducing contamination in collection streams;
   - Facility upgrades that improve the quality and quantity of recovered materials.

   MDAD qualifies as an eligible entity and could apply either independently or in partnership with Miami-Dade County. Past SWIFR rounds closed in late 2024, but future rounds are anticipated to open in mid-to-late 2025.

   As of mid-April 2025, the EPA has not canceled the selection process for the second round of SWIFR and Recycling Education and Outreach (REO) grants, and disbursements are still scheduled for later this year. The current round of SWIFR funding is expected to proceed as planned.

2. The US Department of Agriculture (USDA) Rural Development Office offers **Solid Waste Management Technical Assistance Grants** to public entities seeking to improve waste systems, particularly in underserved or rural areas. While this program is narrower in scope, some airport authorities have used USDA grants to support:

   - Staff training programs on waste separation and contamination.
   - Development of operational manuals for custodial and contractor teams.
   - Feasibility studies and stakeholder engagement for composting or materials reuse initiatives.

   Although MIA is not located in a rural area, the technical assistance model may still be relevant, particularly if the grant cycle expands or emphasizes regional collaboration. As a local government entity, MIA (via MDAD) may be eligible to apply. To strengthen its application, MIA could consider:

- Partnering with local nonprofits or rural communities to develop a regional food waste recovery infrastructure.
- Creating training programs or toolkits that can help smaller airports, rural municipalities, or community organizations implement similar composting methods.
- Leveraging its scale and experience to pilot a replicable model for broader adoption in underserved areas.

3. The **USDA Water & Waste Disposal Loan & Grant Program** offers funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas. In some cases, funds can be used for various related activities, such as land acquisition, equipment purchases, and start-up operations.

   Although MIA is owned and operated by MDAD, a local governmental entity eligible for this program, its urban location and operational scale may limit its competitiveness for rural-focused funding. However, if a composting or recycling initiative is implemented at a rural satellite site or is designed to serve underserved rural populations, MIA may still qualify. Collaborating with a nonprofit or community-based partner could further strengthen the alignment with the program's rural development objectives.

4. The **USDA Office of Urban Agriculture and Innovative Production** (OUAIP) provides competitive grants to support urban composting, food waste reduction, and sustainable local food systems. As a publicly operated facility under MDAD, MIA is eligible to apply as a local government entity. However, strong proposals typically involve partnerships with nonprofits or community organizations and emphasize public benefit.

   For MIA, the fund could support activities such as:

   - Implementing an airport-wide food waste diversion program (e.g., collecting organics from concessions)
   - Establishing composting infrastructure or partnering with local composting facilities
   - Distributing finished compost to community gardens, schools, or greening projects
   - Providing education and outreach on waste reduction and soil health
   - Piloting training programs on sustainable waste practices for staff or local partners

   Recycling alone would not be a primary focus, but composting as part of a closed-loop waste system is well-aligned with the grant's goals.

5. While Florida does not currently maintain a dedicated statewide recycling infrastructure fund (like CalRecycle in California), state transportation and sustainability offices occasionally release competitive grant rounds aligned with energy efficiency and waste diversion.

   In addition, MDAD should monitor programs like:

   - FDEP has historically offered grants for innovative recycling and waste reduction programs which have recently been discontinued. It's advisable to monitor FDEP for any current or upcoming funding opportunities.
   - The Community Change Grants, also offered by EPA and funded by the Inflation Reduction Act (IRA), provide approximately $78 million in funding, with a portion reserved for smaller jurisdictions and environmental justice-focused projects. Eligible initiatives include community-led recycling, green infrastructure, and sustainability education. MIA may be better positioned for this funding by partnering with local nonprofits to pursue future rounds focused on public-facing waste and recycling programs.

     Although the full allocation of funds was initially intended to be awarded in a single competitive cycle in 2024, a change in federal administration during the grant review period has introduced

significant uncertainty. Given that the program's objectives may not fully align with current Executive Orders, the anticipated award announcements are now unlikely to proceed. While new applications are not being accepted at this time, MDAD should continue to monitor the program for any updates or potential reinstatement.

- Florida Resilient Infrastructure initiatives, which may incorporate waste and materials into broader climate strategies;
- Private foundation grants, such as those offered through the Recycling Partnership or Sustainable Florida.

5.1 Key Considerations

The funding recommendations outlined in this study reflect currently available guidance as of April 2025. However, it is important to note that recent actions by the current federal administration have signaled a more cautious or even restrictive approach towards grant programs, including the rollback or rescission of previously awarded environmental and infrastructure funds. As a result, some of the identified grant mechanisms, may face reduced availability, increased competition, or shifting eligibility criteria.

Table 4. Summary of available funding opportunities

Funding Source	Timing	Eligible Activities	Notes	MDAD Fit
FAA Airport Improvement Program (AIP)	Ongoing (annual ACIP process)	Compactors, balers, bins, planning (capital only)	Capital only; no ops or staffing; must be in ACIP	High: Core infrastructure funding
FDOT Aviation Grant Program	Varies by budget cycle	Infrastructure upgrades, pilot retrofits, tech	Competitive; MDAD has received prior funding	Medium: If aligned with terminal projects
MDAD Capital Budget (Airport Revenue)	Ongoing	Capital investments aligned with sustainability goals	Must show ROI and align with ISO/FAA use rules	High: Internal flexibility for capital projects
EPA SWIFR Grant Program	Expected mid/late 2025	Recycling infrastructure, logistics, contamination tech	Next round expected 2025; co-apply with County	High: Infrastructure matches recycling goals
USDA Solid Waste Management Technical Assistance Grants	Oct - Dec (annually)	Training, manuals, stakeholder outreach, studies	Urban site, needs rural tie-ins or pilot framing	Low: Requires rural partnership or regional framing
USDA Water & Waste Disposal Loan & Grant Program	Year-round	Composting facilities, equipment, land (rural focus)	Best fit if project serves rural populations	Low: Urban location limits competitiveness
USDA Urban Agriculture & Innovative Production Grants	Typically Spring/Summer	Composting, food waste diversion, outreach (urban)	Nonprofit partnership strengthens case	Medium: If focused on composting with community benefit
EPA Community Change Grants	Closed: Reopens 2025 - 2026	Education, engagement, sustainability infrastructure	Currently closed; monitor for updates	Medium: If partnered with nonprofit

Funding Source	Timing	Eligible Activities	Notes	MDAD Fit
Florida DEP or Other State Sustainability Initiatives	Variable (if reactivated)	Recycling/waste pilot projects (if reactivated)	DEP grants discontinued; monitor for relaunch	Low: Program currently inactive

6. Resolution R-193-25 (v): Determining whether the current MDAD recycling contract can be used for these purposes

Understanding the contractual environment is essential to evaluating whether the recommendations in this study, particularly those related to infrastructure improvements and system-wide recycling goals, can be implemented in the near term. The County's current recycling contract with Waste Management (WM), executed under Solicitation EVN0000418, defines the service model for recycling at MIA and other designated service zones. At the same time, MDAD operates under a separate agreement for trash collection, which is managed independently. This dual-contract structure, even with the same vendor, introduces operational and administrative challenges that limit flexibility.

6.1 Contract Realities and Current Limitations

The recycling contract gives Waste Management full ownership of all recyclables collected, including valuable materials like cardboard and aluminum. This means there is no opportunity for MDAD to receive revenue or rebates from what is collected.

The greater issue is that the recycling and trash contracts are not connected. They are managed separately, under different terms, and often by different teams. This makes it hard to coordinate improvements, share data, or answer basic questions like whether recycling is more cost-effective than disposal.

These contract limitations are one of the main reasons why a full closed-loop recycling system at the airport is not currently feasible. Until both contracts are aligned or consolidated, MDAD's ability to manage the full waste stream is limited.

6.2 Current Recycling Contract Framework

The County's recycling contract is built on a per-lift pricing model, with fixed escalation rates by container type and no incentives tied to performance or contamination. It does not include volume-based billing or diversion targets. Even with the current contract setup, there are a few steps MDAD can take now without needing a formal contract amendment. These include:

- Reducing how often containers are serviced (lift frequency)
- Consolidating or relocating recycling containers
- Investigating the placement of compactors in areas with high recycling volume

Waste Management has provided preliminary pricing for compactors and the existing contract structure would allow MDAD to begin testing them in selected areas. If this approach proves effective, MDAD and the County could consider adding formal pricing for compactors through a contract amendment.

Larger improvements, however, such as adding incentives for better recycling performance or combining waste and recycling services under one contract would require additional coordination with the County and likely a full contract review or re-bid in the future. In some cases, particularly in airside or security-sensitive areas, operational requirements may prevent MDAD from reducing service frequency or consolidating containers due to safety protocols, limited access windows, or strict pickup schedules.

6.3 Key Considerations

The current recycling contract does not support closed-loop recycling on its own. There is no revenue sharing, no performance tracking, and no alignment with the trash contract. MDAD, however, can still use the tools it has today to test practical upgrades, like compactors, and gather the data needed to inform greater changes later.

In the future, it will be important to:

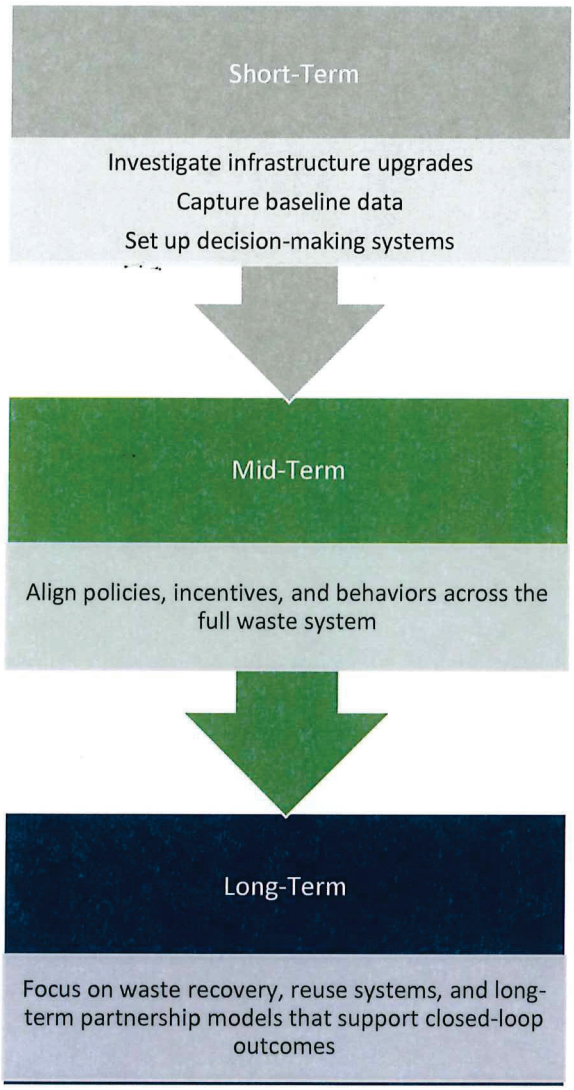
- Work with the County to align how recycling and trash contracts are managed
- Explore creating one combined contract for all waste services
- Consider adding contract terms that incentivize clean recycling and higher diversion
- Revisit tenant and concessionaire lease language to better support shared goals

These steps will be important for MDAD to move towards a more efficient and integrated recycling system.

The next section outlines a phased implementation strategy that builds on these near-term opportunities and prepares MDAD for longer-term improvements.

7. Implementation Strategy and Action Plan

This section translates the findings and recommendations into a phased action plan grounded in MDAD's operational context and stakeholder environment. The strategy moves beyond investigating infrastructure upgrades alone to include behavioral change, data-driven oversight, targeted funding pursuit, and tenant integration. Each phase builds on the last, with clear roles for MDAD, tenants, and service partners.



Short-Term

Focus is on evaluating infrastructure upgrades, capturing baseline data, and setting up systems that enable smarter decision-making.

- Appoint a Recycling & Waste Systems Champion: Designate a lead within MDAD responsible for coordinating across departments, overseeing implementation, and serving as liaison with haulers, tenants, and funders. This role ensures continuity and accountability throughout execution.
- Conduct a comprehensive Waste Characterization and Systems Mapping Study, identifying waste types, flow paths, cost centers, and intervention points across MDAD and tenant operations.
- Investigate Recycling Compactors
- Continue Internal Waste Data Tracking and include waste and recycling
- Review and Prioritize Funding Pathways: Based on infrastructure needs and waste flow insights, refine and submit targeted applications for the most relevant grants
- Partner with Innovation Office to investigate other opportunities

Mid-Term

MDAD could shift from foundational data gathering to aligning policies, operations, and incentives across the entire waste system.

- Operationalize the waste systems map to identify gaps and inefficiencies.
- Integrate waste and recycling expectations into lease and vendor agreements.
- Develop a simple internal dashboard to monitor waste collection and contamination trends.
- Investigate feasibility of small-scale organics pilot programs.
- Continue to review grant and funding opportunities for future investments.

Long-Term

Long-term, MDAD could build on early wins to pursue deeper system recovery and align with Countywide zero waste goals.

- Publish annual waste system impact reports for public transparency.
- Investigate a reusable tableware pilot program in staff or tenant areas.
- Collaborate with Waste Management to explore recovery of additional recyclable materials.
- Align strategies with the County's Zero Waste Master Plan and broader sustainability initiatives.

Conclusion

A fully closed-loop system at MIA is an ambitious goal, that requires significant investigation, coordination, and long-term investment. While certain elements like recycling compactors may offer operational and financial benefits, their feasibility must be carefully evaluated given space, operations, and collection constraints. A key early step is to develop a comprehensive waste systems map, one that includes both recycling and trash, to clarify responsibilities, improve coordination, and support data-driven decision-making.

This study offers a phased, flexible roadmap to help MDAD generate efficiency within its waste systems in alignment with Miami-Dade County's broader zero waste goals. By focusing first on data, leadership, and targeted infrastructure, MDAD can set the foundation for a more integrated, efficient, and resilient system, while remaining responsive to operational realities and future opportunities.

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ATTACHMENT 12

Directive 250196: Update on School Board Recycling Curriculum

Memorandum

Date:

To: Honorable Chairman Anthony Rodriguez
and Members, Board of County Commissioners

From: Daniella Levine Cava
Mayor

Subject: Report on Recycling Outreach and Education Efforts between Miami-Dade County and Miami-Dade County Public Schools - Directive No. 250196

Executive Summary

This report is provided pursuant to Resolution No. R-187-25 ("Resolution") sponsored by Commissioner Oliver Gilbert, III and Commissioner Micky Steinberg, which was adopted by the Board of County Commissioners ("Board") on February 19, 2025. This Resolution directed the Mayor or Mayor's designee to collaborate with Miami-Dade County Public Schools ("MDCPS") to develop a curriculum to educate HeadStart, Pre-kindergarten, Kindergarten, and First Grade students on the importance of recycling. The Resolution also directed the County Mayor or Mayor's designee to take necessary steps to accomplish the goal of collaborating with MDCPS, including entering into an interlocal agreement or education compact with MDCPS, and to provide a report detailing the collaborative efforts that were ongoing between DSWM and MDCPS.

Background

DSWM has collaborated with MDCPS for over a decade to provide educational outreach and promote environmental stewardship. These efforts have included regular participation in classroom presentations, school events, and career days, where DSWM staff educate students on the importance of proper recycling, solid waste operations and sustainability practices in general. This long-standing partnership has served as the groundwork for the expansion of more formal and structured educational programming.

Curriculum Development and Agreement Planning

In direct response to the Resolution, DSWM is actively collaborating with MDCPS to develop an educational program focused on Head Start, Pre-K, Kindergarten, and First Grade students. However, the development of a formal recycling curriculum requires state-level approval. As such, DSWM has identified alternative ways to integrate recycling education into schools to support key environmental goals.

In January 2025, DSWM staff met with the MDCPS Office of Sustainability to explore additional opportunities for collaboration. During this meeting, DSWM learned that MDCPS operates a “Green Schools” program, which aims to educate students on recycling and broader sustainability practices. These efforts are considered educational engagement activities rather than formal curriculum components, and do not require state-approval.

MDCPS also shared that many of its schools have expressed strong interest in educating and engaging students on recycling and related waste diversion initiatives. As a result, DSWM and MDCPS agreed

to strengthen their partnership by streamlining the process through which schools can request recycling presentations and educational outreach.

Current Planning on Ongoing Initiatives

DSWM has maintained a long-standing partnership with MDCPS to provide educational outreach on recycling, solid waste management, and sustainability through classroom sessions, school events, and career days—laying the foundation for a recycling an education program.

Over the past three months, DSWM has conducted 17 school presentations and participated in career days across the school district. One of these presentations is currently under review by MDCPS to assess the potential for a formalized partnership. DSWM anticipates a decision following the conclusion of the 2024–2025 academic year.

To further strengthen this relationship, DSWM continues to host its annual Art Poster Contest, launched in 2023. The contest encourages students to creatively promote recycling and sustainability. Each year, 14 students—one from each Commission district and one at-large—are recognized for their outstanding artwork.

DSWM has also expanded outreach to include the County's Head Start Program. In March 2025, DSWM staff met with program administrators to explore early childhood recycling education opportunities. Based on those discussions, DSWM is developing a puppet show featuring engaging characters and a complementary coloring book to teach young children the basics of recycling in a fun, age-appropriate way. Once completed, these materials will be piloted in Head Start classrooms, with feedback from program staff guiding future outreach activities.

Through these efforts, DSWM continues to advance recycling education, laying the foundation for long-term behavioral change and stronger community-wide recycling practices.

Conclusion

The ongoing outreach and engagement between DSWM, MDCPS, and Head Start reflects a broader effort to educate as many County residents as possible on the importance of proper recycling. DSWM's goal of increasing public understanding of how to recycle correctly aligns with the County's commitment to diverting waste from landfills and advancing long-term zero waste objectives. Recognizing that early education is key to fostering lasting recycling habits, DSWM is eager to continue and expand its collaboration with MDCPS and Head Start, as educating the youngest County residents is a critical step toward recycling right.

To that end, DSWM is committed to strengthening these partnerships through the creation of a formalized program, the development of innovative educational tools, and the establishment of structured agreements. These initiatives will help raise public awareness, boost recycling participation, and build a culture of sustainability and environmental responsibility for future generations. Educating our youngest residents is a critical step in building a culture of sustainability and environmental responsibility for generations to come.

Miami-Dade County and Miami-Dade County Public Schools administrations continue to explore collaborations and partnerships while developing educational compacts to align resources to support students, their families, and the Greater Miami-Dade County community. We share many joint and collaborative programs. To name just a few: Our Summer Youth Internship Program, Apprenticeship program with employers, Head Start, Homeless Awareness programs, tutoring services in County libraries, our Youth Mental Health conference with NAMI Miami, and joint efforts to enhance our urban tree canopy. From community services and prevention programs to affordable and workforce housing for employees to talent recruitment and training, we continue to find ways to partner to bring about significant benefits for students, employees, and overall community.

In accordance with Ordinance No. 14-65, this report will be placed on the next available Board meeting agenda, without committee review. If additional information is needed, please contact Aneisha Daniel, PhD, Director, Department of Solid Waste Management, at Aneisha.Daniel@miamidade.gov.

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