CITY OF KINGSTON ORGANICS DIVERSION STUDY

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NOTICE & ACKNOWLEDGEMENTS

NOTICE

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TABLE OF CONTENTS

Notice & Acknowledgements 2
Notice 2
Acknowledgements 2
City of Kingston 2
Kingston Climate Smart Kingston Commission & Conservation Advisory Council 3
Business Alliance of Kingston & Kingston Uptown Business Association 3
Community Compost Company 4
Greenway Environmental Services 4
New York State Department of Environmental Conservation 4
Town of New Paltz 4
Ulster County Resource Recovery Agency 4
Ulster County Department of the Environment 4
Village of Scarsdale 4
Additional Contibutors 4
Table of Contents 6
Figures, Maps, & Tables 10
Acronyms 14
Executive Summary 16
1. Findings 17
A. Stakeholder Feedback 17
B. Waste Assessments 17
C. Food Waste Estimates 17
D. Food Waste Processing 17
E. Greenhouse Gas Emissions 18
F. Cost Benefit Analysis 18
G. Best Practices 19
2. Recommendations 21
A. Institute Organics Diversion Program 21
B. Use Existing Composting Facility 21
C. Consider Amending Municipal Code 21
D. Distribute Residential Bins 21
E. Dedicated Recycling Coordinator 22
F. Apply for Existing Funding Opportunities 22

Recommended Strategies 23
A. Recommendations from Stakeholder Feedback 23
B. Recommendations from Composters 27
C. Recommendations from Waste Assessments 28
D. Recommendations from Food Waste Estimates 30
E. Recommendations on Food Waste Processing 34
F. Recommendation from GHG Emissions analysis 36
G. Recommendation from Cost Benefit Analysis 36
H. Recommendations from Case Studies 37
I. Recommendations on Municipal Application of Finished Compost 38
J. Recommendations on Organics Diversion from Commercial Food Businesses 38
Reading This Study 40
Introduction 43
Project Partners 44
HISTORY OF Kingston Municipal Solid Waste 44
Study Intent 44
Alignment – City Plans and the NYS CSC Program 45
Local Context Analysis 47
1. Stakeholder Feedback 47
A. Municipal 47
B. Residential & Commercial 61
C. Composters 72
2. Waste Assessments 83
A. Waste Assessments Overview 83
B. Municipal Buildings 91
C. Municipal Recreation Facilities 103
D. Events 109
3. Food Waste Estimates 114
A. Municipal Estimate 114
B. Food Business Estimate 121
C. Events Estimate 128
4. Food Waste Processing 156
A. Composting Facility Site Visits 156
B. Haulers 190

C. Composting Technologies 198
D. Kingston Composting Site Analysis 217
E. Compostable Product Options 230
5. Greenhouse Gas Emissions Analysis 235
A. GHG Emissions Reduction Overview 235
B. Recommendations from GHG Emissions analysis 236
C. Methodology 236
D. EPA WARM Analysis 237
E. Stop Waste Calculator Analysis 238
F. Vehicle Miles Traveled Calculations 239
G. Total Emissions Reduction Estimates 240
6. Cost Benefit Analysis 243
A. Recommendation from Cost Benefit Analysis 243
B. Analysis 243
Best Practices 248
1. Case Studies 248
A. Highlights and Program Considerations 248
B. Recommendations from Case Studies 256
C. Managing & Transforming Waste Streams – A Tool for Communities 258
D. Kingston, NY, Case Study 264
2. Organics Diversion at Events 266
A. Best Practices for Local Governments 266
B. Guides for Event Producers 267
3. Municipal Application of Finished Compost 276
A. Background 276
B. Recommendations on Municipal Application of Finished Compost 279
C. Municipal Use 280
D. Community Use 281
4. Organics Diversion from Commercial Food Businesses 282
A. Sources 282
B. Recommendations on Organics Diversion from Commercial Food Businesses 283
C. Commercial Business Food Waste Reduction Guide 284
Implementation Recommendations 293
1. Phased Implementation 293

A. Phase 1 Program Implementation 294
B. Phase 2 Program Implementation 296
C. Phase 3 Program Implementation 301
2. Municipal Code 303
A. Chapter 350 – Solid Waste Code Recommended Changes 304
B. Draft Ordinance – Compostable/Recyclable Take-Out Containers and Their Disposal 308
C. Draft Ordinance – Organics Diversion at Special Events 309
D. Draft Policy – Compost Procurement Policy 310
3. Municipal Organics Collection – Public Meetings 316
A. Justification for Collection 316
B. Meeting Structure and Organization 316
C. Information Dissemination 317
D. Food Waste / Organics Collection 319
E. Disposal of Organic Waste 319
4. Municipal Tracking of Organics Waste Collection 320
5. Residential Bin Distribution Plan 323
A. Kingston Curbside Waste Collection Service 323
B. Bin Distribution Plans 326
Funding Opportunities 331
1. NYS DEC 331
2. NYS Pollution Prevention Institute 332
3. NYS Green School Grant Program 332
4. US EPA Anaerobic Digestion Capacity and Sustainable Materials Management Grants 332
5. USDA Community Compost and Food Waste Reduction Grants 333
6. Grants for Research and Proof Of Innovative Composting Techniques 333
7. Grant Funding Table 333
Listing of Appendices 338

FIGURES, MAPS, & TABLES

Executive Summary **13**

- Table 1. Impact from Implementing the Kingston Organics Diversion Program

Composters **72**

- Figure 1. Zero Waste Volunteers at three-bin waste stations.
- Figure 2. Community Compost Company food scraps door-to-door collection.

Waste Assessments **83**

- Table 2. Kingston-Owned Properties Assessed for Waste Assessment Inclusion
- Figure 3. Facility Walk-Through Schedule
- Table 3. Municipal Building Walk-Through Summary
- Table 4. Kingston Municipal Recreational Facilities
- Table 5. Recreation Facility Amenities
- Table 6. Recreation Facility Amenities Excluded from Waste Sort
- Table 7. Comparison of Annualized Pounds of Waste by Use Type
- Table 8. Comparison of Annualized Pounds of Waste by Recreation Facility
- Figure 4. Summary of All Event Waste Collected
- Figure 5. Pounds Waste Collected Per Attendee

Food Waste Estimates **114**

- Table 9. Estimated Food Waste of Kingston's MSW Stream, All Residences
- Table 10. Estimated Food Waste of Kingston's MSW Stream, City-Collected Residences
- Table 11. Estimated Food Waste Collected from Kingston MSW for a City-wide Curbside Collection Program
- Figure 6. City of Kingston Department of Public Works Refuse/Recycling Information Calendar 2022
- Table 12. DPW Residential and Commercial Collection Points
- Table 13. DPW Collection Points of Food Waste Producing Businesses
- Figure 7. DPW Tote Schedule
- Table 14. Kingston Refuse Tonnages Reported 2014-2019
- Table 15. Kingston Recycling Tonnages Reported 2014-2019
- Table 16. Kingston Estimated Yard Waste Tonnages Calculated for 2014-2019
- Table 17. Kingston Estimated MSW Tonnages Calculated for 2014-2019
- Table 18. Estimated Tons Annual Food Waste produced and Disposal Cost from Food Businesses
- Figure 8. Commercial Businesses
- Figure 9. Sources for List of Businesses
- Figure 10. Refuse Collection – All Businesses
- Figure 11. Refuse Collection – Businesses Producing Food Waste
- Figure 12. Collection Day of Food Waste Producing Businesses
- Figure 13. Recycling Collection – All Businesses
- Figure 14. Recycling Collection – Businesses Producing Food Waste
- Figure 15. Service Class, Food Waste Producing Businesses
- Table 19. Distribution of Service Class by Refuse Collection
- Table 20. Estimated Waste Production and Costs from All Events
- Table 21. City of Kingston Events Analyzed

- Table 22. City of Kingston Events Held Annually – Quantitative Data
- Table 23. City of Kingston Events Held Annually – Qualitative Data
- Table 24. City of Kingston Events Held Annually – Implementation Assessments
- Table 25. City of Kingston Events Held Annually – Waste Estimates (Pounds)
- Table 26. Event Attendance
- Table 27. Interest in Green Event Practices
- Figure 16. Applications Completed by City Point of Contact

Village of Scarsdale Food Scrap Recycling Program.....158

- Figures 17-18. Village of Scarsdale residential kits.
- Table 28. Scarsdale Food Scraps Recycling Program
- Figure 19. Scarsdale Curbside Collection Schedule
- Figure 20. The Scarsdale Recycling Guide
- Figures 21-38. Village of Scarsdale Food Scraps Program site visit images.

City of Kingston Transfer Station.....173

- Figures 39-40. City of Kingston Transfer Station aerial views.
- Figures 41-42. Locations of Transfer Station activities.
- Figure 43. Area of Transfer Station assessed for potential use as food waste recycling location.
- Figures 44-46. Images of location at Transfer Station assessed for composting viability.

New Paltz "Zero Waste Program" 177

- Figures 47-50. Images showing New Paltz "Zero Waste Program" operations.
- Figure 51. Areas used for composting operation at New Paltz ReUse and Recycling Center.
- Figures 52-60. Images of the Center's composting operation.

Greenway Environmental Services.....184

- Figures 61-62. Aerial views of Greenway's food waste recycling operation.
- Figures 63-66. Images showing Greenways educational components.
- Figures 67-70. Images showing Greenway's composting operations.

Haulers.....190

- Figure 71. The Organix Solutions Layered Approach.

Composting Technologies 198

- Table 29. Compost Bins
- Table 30. Compost Tumblers
- Table 31. Vermicomposters
- Table 32. Indoor Electric Composters
- Table 33. Three-Bin Composters
- Table 34. Small In-Vessel Composters
- Table 35. Summary Table on Municipal-Scale Composting Technologies' Research
- Table 36. In-Vessel Electrified Dehydration Composters – FoodCycler Models

Kingston Composting Site Analysis.....217

- Table 37. City of Kingston Parcels Assessed
- Map 1. City of Kingston Locations Examined for Composting
- Map 2. City of Kingston Locations Viable for Composting-Related Activities
- Table 38. Locations Assessed for Large-Scale Composting
- Table 39. City of Kingston Ward Distribution of Viable Composting-Related Activities
- Map 3. City of Kingston - Election District Boundaries

Compostable Product Options **230**
- Figure 72. Product Cost Comparison: Compostable vs. Non-compostable
- Table 40. Brands and Products Researched

Greenhouse Gas Emissions Analysis **235**
- Table 1. Impact from Implementing the Kingston Organics Diversion Program
- Table 41. WARM 15 Emissions Reduction Calculation
- Table 42. Stop Waste Calculator Emissions Reduction Estimate
- Table 43. Estimated VMT Emissions Under Different Scenarios
- Table 44. Scenario A: All Food Scraps Landfilled
- Table 45. Scenario B: Food Scraps Composted at Greenway
- Table 46. Scenario C: Food Scraps Composted at New Paltz
- Table 47. Scenario D: Food Scraps Composted at UCRRA

Cost Benefit Analysis **243**
- Table 48. Kingston Estimated MSW Tonnages Calculated for 2014-2019
- Table 49. Kingston Refuse Tonnages Reported 2014-2019
- Table 50. Kingston Refuse Disposal Costs for Tonnages Reported 2014-2019, $103 Tipping Fee
- Table 51. Kingston Refuse Disposal Costs for Tonnages Reported 2014-2019, $110 Tipping Fee
- Table 52. Estimated Food Waste of Kingston's MSW Stream, City-Collected Residences
- Table 53. Kingston Costs Savings from Food Waste Diversion for Tonnages Reported 2014-2019, $103 Tipping Fee
- Table 54. Kingston Costs Savings from Food Waste Diversion for Tonnages Reported 2014-2019, $110 Tipping Fee
- Table 55. Estimated Food Waste Collected from Kingston MSW for a City-wide Curbside Collection Program
- Table 56. Kingston Costs Savings from Collected Food Waste for Tonnages Reported 2014-2019, $103 Tipping Fee
- Table 57. Kingston Costs Savings from Collected Food Waste for Tonnages Reported 2014-2019, $110 Tipping Fee

Case Studies **248**
- Table 58. Municipal Case Studies – Curbside Bin Size
- Table 59. Municipal Case Studies – Curbside Collection Frequency
- Table 60. Curbside Collection Frequency Synopsis
- Table 61. US EPA Managing & Transforming Waste Streams
- Table 62. Descriptions and Qualitative Rankings for Policies & Programs US EPA Managing & Transforming Waste Streams Tool

Organics Diversion at Events **266**
- Figure 73. Zero To Go waste station images.
- Figure 74. Portland, OR, events recycling webpage.
- Figure 75. San Francisco, CA, webpage for resources for event producers and free "Sign Maker" tool.
- Figures 76-77. Seattle, WA, webpages for resources for event producers, requirements, brochure detailing the straw and utensil requirements.

Municipal Application of Finished Compost **276**
- Table 63. Sample Compost Spreaders

Organics Diversion from Commercial Food Businesses 282
- Figure 78. Section 304-51 of the New York State Food Waste Prevention and Recovery Act

Municipal Tracking of Organics Waste Collection 320
- Table 64. Organic Collection Tracker

Residential Bin Distribution Plan.....323
- Figure 79. City of Kingston Tote Schedule
- Tables 65-66. Phase 2 Costs, without and with yard waste.
- Tables 67-68. Phase 3 Costs, without and with yard waste.

Funding Opportunities.....331
- Table 69. Funding for Composting

ACRONYMS

AFRI	Agriculture and Food Research Initiative
AMNC	Andrew Murphy Midtown Neighborhood Center
AN	ActiveNet
ASTM	American Society for Testing and Materials
BAK	Business Alliance of Kingston
BPI	Biodegradable Products Institute
CAC	Conservation Advisory Council
CCC	Community Compost Company
CHP	Combined Heat and Power
C:N	carbon to nitrogen ratio
CSC	Climate Smart Communities
CSKC	Climate Smart Kingston Commission
DPW	Department of Public Works
EASP	Extended Aerated Static Pile
EIR	Environmental Impact Report
EPA FOM	Excess Food Opportunities Map
FNC	Forsyth Nature Center
FIFO	First In, First Out
GHG	greenhouse gas
HVRC	Hudson Valley Regional Council
KCAC	Kingston Conservation Advisory Council
KPB	Kingston Point Beach
KUBA	Kingston Uptown Business Association
MFR	materials recovery facility
MSW	municipal solid waste
MTCO2e	metric tons of carbon dioxide equivalent
MWR&R	Municipal Waste Reduction and Recycling
NAICS	North American Industry Classification System
NERC	Northeast Recycling Council
NOFA-NY	Northeast Organic Farming Association of NY
NRDC	Natural Resources Defense Council
NYS	New York State
NYSACC	New York State Association of Conservation Commissions
NYSAR3	New York State Association for Reduction, Reuse, & Recycling
NYS DEC	New York State Department of Environmental Conservation
NYS DOH	New York State Department of Health
NYS P2I	New York State Pollution Prevention Institute
PAYT	Pay-As-You-Throw
PEF	processed engineered feedstock
RFID	radio-frequency identification
SBIR	Small Business Innovation Research

SCAC	Scarsdale Conservation Advisory Council
SPDES	State Pollutant Discharge Elimination System
SSOW	source-separate organic waste
STA	Seal of Testing Assurance
UCDOE	Ulster County Department of the Environment
UCEMC	Ulster County Environmental Management Council
UCRRA	Ulster County Resource Recovery Agency
USDA	United States Department of Agriculture
US EPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

With the New York State Department of Environmental Conservation's Beyond Waste[1] report concluding that "organics make up 30 percent of waste generated statewide", implementing a curbside organics diversion program in the City of Kingston represents a significant opportunity to divert a large portion of the solid waste collected annually. Organics diversion programs can have many benefits, including prevention of methane emissions from landfills and the potential provision of a useful finished compost product, among others.

Compost, or "black gold", is a valuable commodity that returns nutrients to the soil while increasing porosity. Compost starts as food scraps in home or business kitchens, restaurant and take-out leftovers, and expired or forgotten food. It is mostly a wasted resource. For City of Kingston residents and small commercial businesses in 2022 alone, 8.76 tons, or 17,512 pounds, of food waste was transported by truck with other Ulster County waste, to the Seneca Meadows Landfill – a 480-mile, 7.5 hour round trip. The Kingston Organics Diversion Study demonstrates the City of Kingston's commitment to addressing the waste of this commodity as well as improving the environmental and health-based quality of life for Kingston residents and businesses.

This Study provides the City with recommendations for how to greatly increase government efficiency and sustainability, and hopes to serve as a model for other local municipalities. By establishing an approach to minimize organic waste and increase diversion, the City is informed on how to best proceed with allocating personnel and budget to decrease GHG emissions produced by long hauling waste to Seneca Meadows, improving local and regional air and water quality. Reduction in waste could decrease tipping fees for waste disposal, allowing the City to plan for creating usable soil amendments, and propose methods to generate revenue. This Study serves as the most efficient way to determine best practices for implementation, if these practices are cost effective or prohibitive, and plan for a successful transition to organics collection.

The Study aligns with City of Kingston plans, chiefly the 2012 adopted Kingston Climate Action Plan's waste reduction objective and the updated Climate Action Plan 2030, adopted in 2021. The Study also aligns with and responds to six Certification Actions in the New York State Climate Smart Communities (CSC) Program under Pledge Element 5 – Use climate-smart materials management:

1) Government Solid Waste Audit;
2) Organic Waste Program for Government Buildings;
3) Recycling Program for Public Places & Events;
4) Residential Organics Waste Program;
5) Compost Bins for Residents; and
6) Organic Waste Management Plan.

[1] New York State Department of Environmental Conservation, "Beyond Waste: A Sustainable Materials Management Strategy for New York State", 2010, https://www.dec.ny.gov/docs/materials_minerals_pdf/frptbeyondwaste.pdf.

The objectives of the Study were to identify strategies by which the City can reduce waste generation, decrease the impact of materials transportation for disposal/recovery, and increase composting. Fulfillment of these objectives will result in a meaningful reduction of greenhouse gas (GHG) emissions through the reduction of vehicle miles traveled, removal of food waste from the landfill, and the sequestration of carbon by utilizing composted organics in landscape enhancements.

1. FINDINGS

The local and best practices research conducted for the Kingston Organics Diversion Study revealed the viability of a Kingston composting program. A synopsis of the research findings is bulleted below.

A. STAKEHOLDER FEEDBACK

Taken as a whole, stakeholders supported the implementation of a composting program. Stakeholders consulted included municipal elected officials, staff, and appointed volunteers; residents and commercial businesses; and local composting entities. Municipal staff provided critical background and considerations that informed the implementation recommendations. Municipal appointed volunteers from the Kingston Conservation Advisory Council (KCAC) and the Climate Smart Kingston Commission (CSKC) provided their important perspective as local representatives. The appointed volunteers were also instrumental in increasing small business participation in the Kingston Compost Survey, which obtained positive feedback for a composting program from both residents and small commercial business respondents. The local composting entities, Ulster County Resource Recovery Agency (UCRRA) and Community Compost Company (CCC), provided key background on establishing a composting facility, managing food waste contamination, and local, existing food waste collection provisions.

B. WASTE ASSESSMENTS

While waste sorts confirmed that the production of food waste from municipal buildings, recreation facilities, and events is small compared to residential and small commercial businesses, conversations with staff during the facility walk-throughs revealed the overwhelming support for food waste collection from municipal facilities and related programming.

C. FOOD WASTE ESTIMATES

The analysis of the City of Kingston's municipal solid waste (MSW) revealed the divertible food waste component of the total waste stream for constituents receiving Kingston waste management services as an annual average of 3,493.57 tons. A conservative analysis that incorporated research on residential participation rates and set-out rates resulted in an annual average of 1,084.92 tons.

D. FOOD WASTE PROCESSING

This Study found that although a City-operated composting facility was locationally unfeasible, two other viable composting facilities were in close enough proximity for program success: Greenway Environmental Services and the Town of New Paltz composting Facility; UCRRA recently also became an even closer option. The research on food waste composting technologies revealed the expansion of the industry, with many viable options – some more affordable than others – for residential, small business, and municipal composting operations. While the research on compostable product options

revealed that the market has sufficiently expanded to provide many compostable product options, the everyday consumer will still find it difficult to tease out the truly compostable from those products claiming to be compostable. This Study provides the results of research on truly compostable products.

E. GREENHOUSE GAS EMISSIONS

Using United States Environmental Protection Agency (US EPA) WARM 15 model, the Stop Waste calculator, and the Environmental Defense Fund VMT Emissions Calculator, this Study determined that the net City reduction in greenhouse gas (GHG) emissions annually would range between 745.43-1,035.82 metric tons of carbon dioxide equivalent (MTCO2e) by diverting the conservatively estimated amount of 1,084.92 tons/year of food waste. The range in the annual estimated MTCO2e reduction takes into account the various scenarios for vehicle miles traveled (VMT) as well as indirect and direct emissions. Applying the US EPA's Greenhouse Gas Equivalencies Calculator[2] puts the impact from this reduction into perspective, as is shown in Table 1. Impact from Implementing Kingston Organics Diversion Program below.

Table 1. Impact from Implementing Kingston Organics Diversion Program

Reducing GHG emissions by 1,035.82 MTCOe per year from composting Kingston food waste is…	
like taking 223 gasoline-powered passenger vehicles off the road.	like not driving 2,571,118 miles in a gasoline-powered passenger vehicle.
like the carbon sequestered from 17,127 tree seedlings grown for 10 years.	like the carbon sequestered from 1,226 acres of US forests for one year.
like not using 2,398 barrels of crude oil.	like not consuming 101,750 gallons of diesel.
like avoiding emissions from 51.2 garbage trucks of waste recycled instead of landfilled.	like not charging 125,999,886 smartphones.

F. COST BENEFIT ANALYSIS

The cost benefit analysis revealed the financial viability for instituting an organics diversion program. Applying the conservative food waste collection rate of 10.96% to the six-year period of MSW analyzed revealed an opportunity cost of $716,046.66 from landfilled food waste, calculated at $110/ton; averaged annually, the cost savings would total $119,341.11. In a scenario where the City achieved a 35.92% diversion rate, the six-year cost savings would be $2,305,753.75, or $384,292.29 annually. Although it is anticipated that the City would achieve a higher food waste collection rate, and therefore greater cost savings, the conservative collection rate is presented as a baseline for diversion program development purposes.

[2] "Greenhouse Gas Equivalencies Calculator", EPA, March 2022, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

G. BEST PRACTICES

G.1. CASE STUDIES

A review of the composting operations of 11 local government in the United States yielded many key findings.

1. DROP-OFF ORGANICS DIVERSION SITES

Many smaller communities begin their food scrap collection with drop off locations for residents and/or incorporate drop off locations into their overall program.

2. IMPLEMENTING A PILOT PROGRAM

Many of the communities profiled implemented pilot organics diversion programs in advance of a full program roll-out, and used the results and lessons learned to inform further development and expansion of their local programs.

3. IMPLEMENTING AN OPT-IN PROGRAM

No case study communities mandated organics diversion without first conducting a pilot or making it an opt-in program. Many communities have done an opt-in program and found it to be an effective method to ensure community buy-in and low contamination rates.

4. PAY AS YOU THROW / RIGHT-SIZING BINS / REDUCED TRASH PICKUP

Some combination of PAYT, right-sizing bins, and reduced trash pickup was found to be a cost-effective way to ensure organics recycling is incentivized for customers amongst a number of local governments reviewed.

5. MANDATING ORGANICS DIVERSION AT RESIDENCES AND BUSINESSES

Only the three large West Coast cities in the case studies mandated organics diversion for residences and businesses. These longest-standing and most successful organics diversion programs are in places where every household and business is required to separate their food scraps from their trash.

6. MANDATING ORGANICS DIVERSION AT EVENTS

The communities that mandate organics diversion for residences and businesses also mandate organics diversion at events. They also provide varying levels of guidance and materials to assist in the collection of compostable materials.

7. YARD WASTE IN CURBSIDE FOOD WASTE COLLECTION BINS

Inclusion of yard waste in curbside food waste collection bins varies across local governments reviewed, depending on the size of the food scrap collection bins chosen and whether yard waste comprises a significant amount of residential organic waste.

8. USE OF BIN LINERS / COMPOSTABLE BAGS FOR ORGANICS

Whether bin liners or compostable bags are required by local governments for residential curbside bins appeared to depend on whether locations had long freezing periods in the winter. Some communities require compostable plastic liners, while others allow paper bags inside the larger curbside bin.

9. STARTER KITS

A number of the communities reviewed provide inexpensive or free materials to help residents get started, including a kitchen collection pail. These communities found that doing so increased their program's accessibility to residents.

10. EDUCATIONAL & OUTREACH MATERIALS

Many municipalities have pursued various public engagement strategies to recruit participants and promote compliance, such as placing A-frame signs in neighborhoods, distributing flyers and tabling at community meetings and events, mailers, sending flyers home from public schools, stakeholder meetings, emails and surveys, and communicating with both residents and landlords of multifamily properties to obtain buy-in, among many others.

11. CURBSIDE COLLECTION

Across the local governments reviewed, curbside bin sizes for refuse, recycling, and food waste ranged from 12 gallons to 96 gallons for refuse and food waste. The recycling curbside bin size also ranged up to 96 gallons, but none of the communities reviewed had a bin size smaller than 32 gallons. Of the communities reviewed, 70% accepted yard waste with their food waste. With regards to curbside collection frequency, all but one community had weekly food waste collection. However, only one community was found to have reduced its refuse collection to every other week; three communities had every other week collection for recyclables.

G.2. ORGANICS DIVERSION AT EVENTS

The literature review for organics diversion at events revealed the following best practices: create a detailed plan for how waste will be handled, separated, and disposed for composting; adequately train volunteers, vendors, and event staff on how to handle waste; provide clear and educational signage for attendees, with volunteers at each waste station, if possible; communicate event's waste diversion goals to all potential attendees before and during the event, and evaluate results after the event.

G.3. MUNICIPAL APPLICATION OF FINISHED COMPOST

The literature review revealed that there are many municipal uses for finished compost. Examples range from landscaping uses, such as for bioswales, parking lots, seed cover, and erosion control. Ensuring use of finished compost is best accomplished by implementing an ordinance to mandate use of compost for appropriate activities, incorporate compost usage amounts into vendor contracts, and establishing a compost giveback program for constituents.

G.4. ORGANICS DIVERSION FROM COMMERCIAL FOOD BUSINESSES

A literature review identified best practices for diverting organics from commercial food businesses, with a focus on restaurants. Best practices and considerations are outlined for food waste reduction and diversion for both back-of-house and front-of-house, donating edible food, and in-house vs. off-site composting. Findings noted back-of-house waste reduction practices (tracking waste, inventorying food, and forecasting demand); meeting legal requirements for donating edible food; considerations for in-house versus outsourcing food waste removal; guidelines for off-site composting (assessing food waste amounts, comparing haulers, assessing and preparing storage space); guidelines for on-site composting (assessing food waste amounts, assessing and preparing storage space, selecting

composting technology, staffing considerations, assessing space for composting materials, plan for reducing disease vectors, and finished compost use); and education and promotion to ensure success.

2. RECOMMENDATIONS

The overarching recommendations for the City of Kingston appear below. More detailed recommendations specific to each area of this Study appear within their respective sections.

A. INSTITUTE ORGANICS DIVERSION PROGRAM

This Study recommends a five-pronged organics diversion program to reach all City of Kingston constituents receiving City waste management services.

1) A phased curbside food waste collection program made available to both residential and small commercial customers on its weekly MSW collection runs.
2) A neighborhood-based program to supplant the phased curbside food waste collection program, consisting of neighborhood composting locations as well as food waste drop-off and/or compost distribution locations throughout the City's wards.
3) Continued and increased promotion of residential backyard composting. The Study assumes that the City will continue to educate residents on the availability of backyard compost bins for purchase from the Ulster County Resource Recovery Agency (UCRRA). Research conducted and made available in this Study on residential composting technologies also allow the City to inform its constituents of additional composting technologies.
4) Education on the availability of on-site composting technologies for small commercial food waste producing businesses.
5) A phased food waste collection program for municipal buildings, recreation facilities, and events.

B. USE EXISTING COMPOSTING FACILITY

A comprehensive analysis of City sites potentially viable for serving as composting facilities revealed that food waste will be best processed by one of the three operational Ulster County composting facilities: UCRRA, Town of New Paltz composting facility as part of its Zero Waste Program, and Greenway Environmental Services. While a few haulers in the region provide curbside food waste collection services, the City is likely to add this service for constituents already receiving City waste management services.

C. CONSIDER AMENDING MUNICIPAL CODE

Draft legislation and/or code changes are provided as a means of accelerating and supporting other recommendations towards the implementation of a municipal organics diversion program. Changes are based on best practices from other municipalities or template legislation.

D. DISTRIBUTE RESIDENTIAL BINS

Cost estimates for distribution of residential bins were calculated for voluntary and mandated scenarios, an included calculations based on yard waste inclusion or exclusion in the collection program. In a voluntary scenario, such as a pilot program of 150 customers or an opt-in program for 1,000 customers, costs ranged from approximately $5,500 to $51,500, respectively. Cost also varied if yard waste collection was incorporated into either voluntary program. In a mandated scenario, costs

for 6,600 bins for residential and small commercial customers ranged from $225,736 without yard waste collection and $347,486 with yard waste collection. The increased in cost is due to larger bin sizes to hold the yard waste.

E. DEDICATED RECYCLING COORDINATOR

The Commercial Food Waste Reduction Guide outlined in this Study can serve as a starting place for businesses to consider the food waste diversion and composting practices most appropriate to their particular needs. However, there remains an important role for dedicated staff to develop and provide education and guidance to businesses, such as hands-on coordination of best practices, implementation plans, signage templates, assistance with communication, troubleshooting, assistance with training staff, advising on issues of non-compliance, management of composting program funding and costs, and education on reducing contamination. The City has the option of considering a one or two-year appointment to oversee commercial food waste collection, after which duties could be transferred to existing staff.

F. APPLY FOR EXISTING FUNDING OPPORTUNITIES

Research on funding opportunities is presented, focusing on New York State and federal grant opportunities from the United States Environmental Protection Agency (US EPA) and the United States Department of Agriculture (USDA). A grant table outlines 15 funding opportunities identified, including grant name, grantor, opportunity description, funding amount and match requirements, and eligible applicants.

RECOMMENDED STRATEGIES

This Study assessed the recommendations made as part of the various components of the Study's research. The recommendations included in this section informed the phased implementation found in Implementation Recommendations.

Only in the most well-off communities will municipalities have sufficient staff capacity to run programs in the most effective and efficient manner. Competing priorities create daily challenges. Incorporating new programming creates additional challenges, but also provides an opportunity for improving upon past practices. These recommendations reveal a number of opportunities for improving past practices with the institution of a new financially and environmentally beneficial food waste collection program.

A. RECOMMENDATIONS FROM STAKEHOLDER FEEDBACK

A.1. RECOMMENDATION FROM KCAC

- **Include information on bins for in-home food waste collection, back yard compost bins, and curbside food-waste bins as part of the City's residential bin distribution plan.** Appointed KCAC and CSKC volunteers requested that this information be part of the informational materials distributed to residents. The availability of this information would allow residents to independently determine how to best divert food waste in their household.

A.2. RECOMMENDATIONS FROM DPW

- **Reduce contamination rates with a fully developed education and outreach campaign.** DPW staff's experience with higher than anticipated tipping fees due to contamination with the City's recyclables informed their recommendation.
- **Include yard waste with food waste collection.** Not only is there precedence with local governments' acceptance of yard waste with food waste collection, it would streamline DPW's current yard waste collection and processing practices to include yard waste with food waste. The selected composting facility would need to accept combining these two waste streams for it to be implemented.

A.3. RECOMMENDATIONS FROM UCDOE & UCRRA

- **Collaborate with local composting companies, such as Community Compost Company, to determine whether neighborhood composting can operate during winter.** UCDOE staff noted that in the case where neighborhood composting was infeasible during winter, a drop-off system would be a good alternative.
- **Build a robust team of volunteers to reduce contamination in the organics waste stream.** UCRRA staff noted the importance of volunteer participation in the low contamination rates seen from the Village of Scarsdale, a Westchester County community. UCRRA accepts the Village's food waste and attributes the low contamination rates to the extensive education and outreach component of their food waste collection program. The volunteer team would be critical in reducing plastic contamination in the organics waste stream, with is a common issue seen by UCRRA.

A.4. RECOMMENDATIONS FROM EVENTS STAFF

- **Engage vendors and organizers to improve food waste collection at events.** Events staff noted the importance of this engagement to ensure smoother implementation of food waste collection at events. Staff recommended using existing relationships with event organizers and frequent vendors to encourage program participation from other vendors. Events staff also recommended providing vendors with a list of compostable products and where products may be purchased to increase use of truly compostable products.
- **Provide an incentive or discount on refuse totes when food waste or recycling totes are requested.** Events staff made this recommendation as a way to increase food waste collection for a voluntary food waste collection program for events.
- **Streamlining the events application process to benefit the food scraps collection program for events.** Events staff noted that streamlining the process would ensure that documentation is collected from all organizers and vendors and provide additional opportunities for education and outreach.
- **Centralizing the City's application review process.** The decentralized nature of the City's application review process for events and recreation facility rentals is likely to add complexity to the critical educational component associated with the implementation of an organics collection program for events. Depending on the event size or past relationships, applications may be reviewed and approved by the Parks & Rec Superintendent, Parks & Rec Clerk, Special Events Coordinator, or a recreation facility's caretaker. Additionally, it is likely that this decentralized structure limits the effective implementation of a refuse collection fee system.
- **Pilot food scraps collection at City-hosted events and employ local high school students as waste ambassadors.** Events staff recommended piloting food scraps collection at one of the number of events hosted by the City as a high degree of control over the food scraps collection process would be possible. Events such as the 4th of July Parade and the Italian American Festival were mentioned. Events staff noted that many high schools have environmental clubs and all high schools require completion of community service hours.

A.5. RECOMMENDATIONS FROM FIRE DEPARTMENT STAFF

- **Continue firehouse waste reduction measures by replacing Keurig pods with reusable pods.** Firefighters noted that prior to purchase of Keurig machines, full coffee pots were frequently made for only one person. Keurig has reduced coffee waste, but use of disposable Keurig pods would hamper composting of coffee grounds.
- **Replace paper towel stations with high-efficiency electric hand dryers.** Different stations expressed differing preferences for hand drying prior to heading out on a call, an important consideration given that firefighters need to leave immediately for calls. Recent research on the environmental implications of GHG emissions emitted during the production of electric hand dryers versus paper towels using life cycle assessment finds that high-efficiency electric hand dryers emit less GHGs during their production cycle than paper towels.[3] The City should

[3] A number of recent studies affirm this statement:

- Joseph T, Baah K, Jahanfar A, Dubey B., "A comparative life cycle assessment of conventional hand dryer and roll paper towel as hand drying methods", Sci Total Environ, 2015 May 15;515-516:109-17. doi:

transition hand drying in all public spaces to high-efficiency electric hand dryers; high-speed electric hands-in dryers were found to be the most efficient. Certain locations, such as in kitchen areas, may not be conducive to electric hand-dryers. Additionally, a recent study found that drying hands with a jet dryer until completely dry "is the best method to eliminate bacteria on hands".[4]

- **Provide informational background on food spoilage timeframes.** At times, a fire fighter may get four calls in a row while attempting to eat one meal. Food left out while fire fighters are out on a call is typically thrown away when fire fighters return from the call. Providing information on the length of time it takes for food to become unsafe to eat can help reduce the amount of wasted food associated with meals.
- **Provide information on what foods can be composted and clear policies on food waste reduction measures.** Firefighters conveyed the importance of receiving this information to increase food waste collection program participation and implementation success.

A.6. RECOMMENDATIONS FROM BAK & KUBA PUBLIC INPUT MEETING

- **Consider conducting a customer survey to determine desire for large food portions.** To determine the viability of reducing portion sizes at restaurants, which would reduce food waste with end-consumers, the City should consider conducting a survey to learn if the Kingston community is open to restaurants reducing food portions.
- **Update restaurants on the State's and County's food donation regulations.** The public input session revealed that it would be beneficial to provide a simple informational guidance document that outlines food donation regulations. Outreach to restaurants at their establishments and/or through association meetings, as well as dissemination via media outlets will improve uptake of information.
- **Consider establishing a restaurant food waste diversion task force to manage the unveiling and outreach for a successful food scraps collection program.** To address concerns raised by attendees of the public input meeting, instituting a task force to discuss potential solutions to concerns would be beneficial for food diversion program success.
- **Consider collecting restaurant food waste twice weekly.** Food waste putrefaction during summer months is an important concern to be addressed as it can have a detrimental impact on a food waste collection program. The easiest approach is providing twice weekly food waste collection during summer months. Twice weekly collection may need to be the standard practice year-round if most restaurants are found to have insufficient food waste storage space.

10.1016/j.scitotenv.2015.01.112. Epub 2015 Feb 18. PMID: 25704267. https://pubmed.ncbi.nlm.nih.gov/25704267/.

- Ingwersen, W., M. Gausman, A. Weisbrod, D. Sengupta, S. Lee, J. Bare, E. Zanoli, G. Bhander, AND M. Ceja., "Detailed Life Cycle Assessment of Bounty Paper Towel Operations in the United States", JOURNAL OF CLEANER PRODUCTION, doi: 131:509-522, 2016, https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&direntryid=331163.
- Gregory, Jeremy R., Trisha M. Montalbo, and Randolph E. Kirchain, "Analyzing uncertainty in a comparative life cycle assessment of hand drying systems", International Journal of Life Cycle Assessment 18:8 2013, pp.1605-1617. https://dspace.mit.edu/handle/1721.1/103115.

[4] Suen LKP, Lung VYT, Boost MV, Au-Yeung CH, Siu GKH, "Microbiological evaluation of different hand drying methods for removing bacteria from washed hands", Sci Rep. 2019 Sep 24;9(1):13754. doi: 10.1038/s41598-019-50239-4. PMID: 31551459; PMCID: PMC6760209. https://pubmed.ncbi.nlm.nih.gov/31551459/.

- **Consider conducting an additional survey of restaurants to understand challenges associated with a food waste collection program.** Areas to explore in this additional survey should include food waste storage capacity and need for year-round twice weekly food waste collection. The survey can be conducted by a restaurant food waste diversion task force and inform the City of additional resources and policies to ensure programmatic success.

A.7. RECOMMENDATIONS FROM THE KINGSTON COMPOST SURVEY

1. RESIDENTIAL COMPOSTING RECOMMENDATIONS

- **Inform residents of home composting options.** While the survey revealed that the most commonly used composting method amongst respondents is backyard composting, providing residents with an informational flyer on the various home composting options will increase home composting participation and reduce the per ton cost for disposal of food waste at a local composting facility. Appropriate composting technologies are provided in this Study in "Composting Technologies". The flyer should include information on the backyard composters available through UCRRA as well as the private collection services offered by companies, such as Community Compost Company, and methods to reduce larger pest incursions into composting bins.
- **Inform residents of food waste containment practices as part of a curbside collection program roll-out.** Residents who indicated they did not compost nor divert their food waste noted odor and the unpleasantness of handling food waste as concerns. The City should create an informational guide that details the variety of kitchen food waste collectors, refrigerator or freezer storing practices, and variety of bin liners that can help address concerns. This Study provides a comprehensive set of options in "Composting Product Options". Any informational documents should clarify that the decomposition rate of food waste in landfills is quite slow.
- **The City should conduct a bin right-sizing analysis in advance of rolling out a curbside residential food waste collection program.** Residents were very concerned about received another large bin for collecting food waste. The City should consider the existing range of bins that have been made available to residents for refuse, recycling, and yard waste to identify opportunities for right-sizing bins with a food waste collection roll-out. The bin size practices of other municipalities that have instituted residential curbside food waste collection programs should be consulted in this assessment, referencing Table 59. Municipal Case Studies – Curbside Bin Size in "Collection Synopsis" in this Study.
- **Consider purchasing backyard composters to distribute at minimal or no cost to residents.** The 2010-2012 Kingston Alcoa-funded study revealed that free backyard composters were integral to engaging participants as well as incentivizing participation. The study required reporting on household food waste production, with the penalty of composter removal for lack of participation; at large scale distribution, coordinating reporting is unlikely. A strong education and outreach component prior to distribution would increase bin use.

2. FOOD BUSINESS RECOMMENDATIONS

- **Consider collecting restaurant food waste twice weekly.** See recommendation in "Recommendations from BAK & KUBA Public Input Meeting". The survey confirmed that twice weekly collection was common amongst food business respondents. The City could incorporate this inquiry as part of the additional survey of restaurants.

- **Consider establishing a fee-based food waste collection program for food businesses.** Food business survey respondents indicated an openness to participating in a fee-based program. The City could incorporate this inquiry as part of the additional survey of restaurants. See recommendation in "Recommendations from BAK & KUBA Public Input Meeting".
- **Provide pre-consumer food waste reduction education.** Survey responses from food businesses demonstrated an interest in this education component. Since pre-consumer food waste is a significant portion of food business food waste, providing this educational offering and guidance documents would be beneficial to overall food waste reduction.

B. RECOMMENDATIONS FROM COMPOSTERS

- **Reference education models implemented by Community Compost Company, Royal Carting, and the Village of Scarsdale in developing the City's education model to ensure that contamination rates are low for curbside food waste collection.** UCRRA noted the importance of a low contamination rate for maintenance of their certification standard with the US Composting Council and the connection to a strong education model. Whether curbside collection is managed by City DPW and Parks & Rec staff or contracted out to a hauler, a strong educational component is critical to programmatic success. CCC noted that any food waste collection program will only be successful with a comprehensive education component.
- **Institute three-bin waste station at events in combination with waste station volunteers.** Research shows that the three-bin waste station is the most effective collection method for on-site waste separation, with separate bins for waste, compostables, and recycling. A separate container for liquids is highly recommended for events that are expected to have a high liquid content. Five-gallon buckets with an opening for liquids is a good option, given that they are easily transportable once full.[5] In UCRRA's experience, the low contamination rates from large festivals like the Clearwater Festival are directly linked to the posting of waste station volunteers at three-bin waste stations. Other best practices UCRRA attributes to a low contamination rate from this large festival are iconographic information sheets affixed to each waste bin, indicating what goes into each bin, including the requirement that vendors use compostable or recyclable service ware.
- **Locate residential food waste drop-off locations that are more regularly frequented.** UCRRA has found that drop-off locations at community gardens or in local neighborhoods have greater participation rates than at transfer stations.
- **Consider instituting a residential locked drop site model to reduce contamination.** CCC recommended locked drop-sites to ensure minimal contamination, but noted that a strong education component is also necessary to reduce contamination, which is typically lower with curbside collection. Whether a locked drop site model or traditional drop-off site model is used, locations should have an assigned advocate who manages the food scraps collection bins and provides education.
- **Bypass differing composting facility requirements on the use of bin liners by promoting the use of paper bags.** Composting facilities have differing requirements around the use of bin liners based on the certification they are trying to meet. UCRRA's US Composting Council certification allows for UCRRA's acceptance of BPI certified compostable products. CCC needs

[5] Athena Lee Bradley, "Guidance for Special Event Food Waste Diversion".

its product to obtain the Northeast Organic Farming Association of NY's (NOFA-NY)[6] organic certification seal; they do not accept compostable bags because it is difficult to confirm that they liners are from fully plant based, non-GMO[7] materials.

- **Incorporate food waste reduction measures into residential educational materials.** CCC found that formerly skeptical participants improved their source separation practices and reduced food waste through practices like planning meals and food shopping with a list.
- **Identify responsible municipal parties for contamination checks and removal of contaminants in a curbside food waste collection program.** Managing the cost of curbside collection and managing contamination are important to programmatic success. CCC highlighted the importance of a thorough and ongoing educational component for municipal sanitation laborers as a means of ensuring that contamination is kept to an allowable minimum.
- **Collaborate with existing partners to support the City's food scraps collection educational efforts.** CCC recommends partnering with UCRRA educators in supporting the educational efforts of a Kingston food scraps collection program.

C. RECOMMENDATIONS FROM WASTE ASSESSMENTS

C.1. RECOMMENDATIONS ON MUNICIPAL BUILDINGS

- **Replace paper towel stations with high-efficiency electric hand dryers.** See full description of recommendation in "Recommendations from Firehouse Staff".
- **Develop an internal and external facing marketing campaign to be rolled out a minimum of 6 months prior to implementation of a food waste collection program.** Any campaign requiring substantive behavioral change for success must be accompanied by a strong marketing campaign. Both internal and external marketing materials explains the various benefits of the program (cost-savings, GHG emissions savings, materials recycling) and the ease of implementation. The marketing campaign for municipal organics diversion would ideally be married to the organics diversion marketing campaign for residents and small business receiving City waste collection as a City-wide campaign would have the greatest participation rate, as was seen with the Philadelphia Recycling Rewards Program, administered by RecycleBank. Appropriate lead time allowed for properly informing program participants prior to implementation of any program introducing a significant change is critical to programmatic success. It will also be critical to preventing the contamination rates seen with recycling and aid in reducing recycling contamination rates.
- **Incorporate food waste collection guidelines into personnel City's handbook.** Incorporating composting expectations into an official City guidance document will reinforce the new food waste collection policy and establish it as a new cultural norm for current and new City staff.
- **For staff-accessible waste containers, establish a three-bin waste station system for food waste, recycling, and refuse, incorporating clear signage for each receptable.** Without the 24/7 presence of a waste ambassador, clear signage is key to ensuring waste is deposited in the correct container. As is seen from the best practice signage from Appendix H. Case Studies, less

[6] "About Organic Certification", NOFA-NY.

[7] GMO stands for genetically modified organisms, such as plants, animals, or microorganisms. GMO products contain organisms that have had genetic material "altered in a way that does not occur naturally by mating and/or natural recombination." "Frequently asked questions on genetically modified foods", World Health Organization, https://www.who.int/news-room/q-a-detail/FAQ-genetically-modified-foods. Accessed November 2020.

words and more images make it easier to follow instructions with a three-bin waste station. The City should reconvene with staff to determine whether an interest in a desk-top food waste collection container may be of interest in some offices rather than just the floor waste station system.

- **At highly trafficked municipal buildings make available to the general public a three-bin waste station system.** Leading by example is key to programmatic success. Making participation available to constituents in the City's new programs and policies at buildings with high visibility provide an additional opportunity for communicating new programming. For a multi-lingual municipality like Kingston, visual signage with minimal words will help all constituents participate effectively. Where contamination has been seen to be high, consider making the three-bin waste station with waste ambassadors available during times or events with high attendance. If regularly implemented, over time highly trafficked buildings are likely to see a reduction in contamination.
- **Develop a green purchasing policy that clearly identifies compostable products allowable for use on City property and for City programming.** The "Compostable Product Options" section in this Study lists numerous product options certified to be compostable and should be used as a guide for specific recommendations in the green purchasing policy. The policy should first and foremost encourage the use of reusable dishware and cutlery where there are available facilities to clean them. It is also recommended that the City confirm the acceptability of compostable materials by the composting facility intended for the City's food waste diversion program. Two of the composting facilities researched in this Study do not accept compostable products, even with BPI certified.

C.2. RECOMMENDATIONS ON RECREATION FACILITIES

- **The City should align its various application process practices, from streamlining the intake process to the applications used.** The City's application process for recreation facilities and events is decentralized. For events, depending on the event size or past relationships, applications may be reviewed and approved by the Parks & Rec Superintendent, Parks & Rec Clerk, Special Events Coordinator, or a recreation facility's caretaker. Non-event related recreation facility applications are received by paper, completed online via ActiveNet with and without Kingston staff support, and completed by paper by staff on behalf of applicants. Aligning the application process will allow for another consistent point of education and outreach for a food waste collection program. Application(s) should be updated to include an organics diversion section with hyperlinks to guidance documents for food waste collection in the respective settings.
- **Expand use of a recreation facility management platform for all City-hosted and -supported events and recreation facility rentals.** The City currently uses ActiveNet, an events management platform, for some events and most recreation facility rentals, but it is used inconsistently. Uniform use of a single events management platform for rentals and events by all City staff will allow for greater coordination amongst all departments involved. The events management should include food waste and recycling education and outreach prompts for staff as well as the general public.
- **Determine the appropriate number and location of waste cans for recreation facilities, taking all waste streams to be collected into account.** The facility walk-through by and large revealed an appropriate placement of refuse cans at Kington outdoor recreation facilities, although most

locations did not include recycling cans and Dietz Stadium Parking area and Kingston Farmers Market appeared to have fewer than needed cans. Placement of recycling cans alongside refuse cans was inconsistent in indoor recreation facilities. A standard best practice is tandem placement to increase diversion of recyclables. For those locations where a three-bin system will be instituted, the bins should be placed right next to each other.

C.3. RECOMMENDATIONS ON EVENTS

- **Events using three- or four-bin waste collection stations must use volunteers to produce uncontaminated waste streams.** The clearly labeled unmanned waste stations were insufficient to reduce contamination, pointing to the importance of incorporating an educational/outreach component for reduced contamination. Liquids in recyclable bottles were a significant presence in the events waste sorts; a fourth collection bin for liquids would be needed to reduce the weight of recyclables. Even with volunteers available to provide event attendees with proper waste disposal guidance, it may still be necessary to employ persons to physically remove contaminants in order to reach zero contamination, as was seen with the Made in Kingston event.
- **Frequent and regularly recurring updates on permitted divertible items for recycling and organics diversion programs must be provided to staff and participating constituents to reduce contaminants in both waste streams.** With the recycling commodities market frequently in flux, permitted recyclables will change. UCRRA must ensure that its notification processes to municipalities is frequent and clear to reduce undue contamination fees. Holding frequent and regular recurring meetings provide the opportunity to update on permitted divertible items as well as identify challenges being encountered and troubleshoot solutions. During a couple of the events waste sorts, the recycling of cardboard covered in tape or printed with high-gloss ink revealed that laborers had not known of the new UCRRA requirements related to cardboard.
- **Events serving ware must be clearly identifiable as compostable for event attendees.** Events waste sorts with unmanned, three-bin waste stations with signage revealed attendees' commitment to compost seemingly compostable paper serving ware. The development of a Vendors' Waste Management Guide that includes approvable compostable serving ware would be very effective in supporting vendors in meeting this requirement. A discussion of the broad availability of these products are discussed in this Study in "Compostable Product Options"; it is important to note that any identification of truly compostable products must start with the BPI.[8]

D. RECOMMENDATIONS FROM FOOD WASTE ESTIMATES

D.1. RECOMMENDATIONS FROM MUNICIPAL ESTIMATE

- **Determine if waste collection routes and schedules need to be modified.** A majority of residential food waste collection, and a significant portion of commercial food waste collection, is likely to be allocated to the Kingston DPW in lieu of private haulers given the current hauling practices in the City. Undertaking food waste hauling may require reconfiguration of existing DPW collection routes and schedules. This requires consideration of the frequency of food

[8] BPI, https://bpiworld.org/.

waste collection. Some municipalities (Renton, WA; Vancouver, WA; and Portland OR) incentivize food waste collection by scheduling solid waste pickup every other week and food waste pickup weekly;[9] other food waste collection practices are outlined in this Study's Appendices, Appendix H. Case Studies. Larger municipalities use GIS route optimization to ensure efficient collection and pickup times, reducing route collection times, distance traveled, and carbon emissions,[10] though this may not be necessary for a municipality the size of Kingston. Additionally, collection routes for commercial establishments must be aligned with the amount of storage space available to commercial establishments as collected food waste should not become highly odorous or attract pests due to inopportune collection frequencies. For large generators and in summer months this may entail twice-weekly collection – a frequency that may be more appropriate for private haulers. There is the precedence of twice-weekly collection by Kingston Parks & Rec laborers in the warmer months. The City of Toronto found that automated trucks with bin liners were most appropriate for organics collection and claimed that they reduced repetitive movement injuries, given the heavier weight and higher compaction of organics in comparison to solid waste or recycling.[11]

- **Consider negotiating provision of the City's yard waste to the composting facility.** A six-year analysis of the City's yard waste revealed that Kingston averages an estimated 1,244.56 tons of yard waste annually. The City should consult with the selected composting facility to determine if, in what form, and what types of yard waste the composting facility may accept with or separately from food waste.

D.2. RECOMMENDATION FROM FOOD BUSINESS ESTIMATE

- **Include food waste collection from food waste-producing businesses along the City waste collection routes a part of a municipal curbside food waste collection program.** The food waste estimation analysis conducted for this Study revealed that 71 businesses receiving both City and private refuse collection account for an annual tipping fees expense to the City of approximately $100,604.70 based on an annual average estimated food waste production of 958.14 tons. Capturing even 50% of these tipping fees cost savings from a food waste collection program would be beneficial. It is recommended that food waste collection from food waste producing businesses be piloted by collection days, starting with collection days with the smaller number of businesses, to allow for programmatic adjustments for the larger collection days. The overwhelming majority of food waste producing businesses receiving City waste collection are full- and limited-service restaurants.

D.3. RECOMMENDATIONS FROM EVENTS WASTE ESTIMATES

- **Implement organics and recycling collection at City-hosted and -sponsored events.** The City is losing approximately $30,750.35 annually in tipping fees for City-hosted and -sponsored events, with $21,722.81 in tipping fees specifically for City-hosted events. Landfilled food waste as well

[9] "Examples and Resources for Transforming Waste Streams in Communities (#1-50)", US EPA, REG 09, 2015.

[10] Nipuni Silva and Janaki Sandamali. 2021, "Solid Waste Route Optimization Using GIS Techniques for Galle Municipal Council".

[11] Lori Lovely, "Collection Containers for Organic Waste", MSW Management, 2018, https://www.mswmanagement.com/collection/carts-bins/article/13032886/collection-containers-for-organic-waste. Accessed December 20, 2021.

as recyclables account for these tipping fees, with high contamination rates in the recycling waste stream accounting for their landfilling. Implementing 3- or 2-bin waste stations at City-hosted events and requiring stations at sponsored events would enable the City to improve waste diversion practices for recycling during the piloting and promotion of organics diversion. Parades, festivals, and events at the waterfront, which were listed as long-term implementation opportunities, would require an assessment of event site planning practices to identify changes that would optimize organics and recycling collection. If the City does not require compostable food ware, event hosts can offer preferred placement or reduced fees for vendors providing.

- **Work closely with financially responsible parties to roll-out food waste and recycling collection at events.** Roll-out of a diversion program at events will require six months lead time to gather stakeholders, inform them of the upcoming program, and gather concerns. These concerns can be incorporated into a Vendors' Waste Management Guide.[12] Initial notification of vendors should occur on approval of a new City policy, with subsequent notifications no more than 6 months prior to roll-out at first event, at application distribution, and two weeks prior to an event.
- **Institute outreach and education components for all events.** High contamination rates associated with recycling diversion necessitate a comprehensive education and outreach campaign for event hosts and attendees to ensure the success of organic and recyclable waste diversion at events. Outreach and education, for Kingston staff, and event attendees and vendors, will be critical to the success of an initial implementation and ongoing maintenance of a food waste diversion program for events. Diversion program success will require staff's repeated touch points with events hosts and vendors to ensure an understanding of successful implementation of the diversion program. Staff with the greatest interaction opportunities event hosts and vendors would be most suitable. An outreach and education opportunity that can incentivize waste diversion would be an annual award for the most eco-friendly event (compostables use, outreach & education, low contamination of compostables, high diversion rate overall).
- **Develop a Vendors' Waste Management Guide.** Clear communication with vendors regarding requirements, expectations, and specific instructions both prior to and during events will increase the amount of food waste and recycling diversion as well as reduce contamination. This vendor-oriented guide will also serve as an educational tool for events hosts for City-supported events and as an educational guide for City staff who will engage with events hosts and vendors. The Guide should be included in the vendor application process and in any pre-event communications with vendors. The Guide should list the acceptable contents for each bin. Guides should be periodically updated with currently acceptable content by confirming with UCRRA for recyclables and the composting facility for acceptable food waste and compostable serving ware. Kingston staff should inform vendors of these changes on sharing of the vendor application. When events are managed by a non-City department, the Guide should require vendor preparation of a site plan as part of pre-event preparations, clearly indicating the location of waste stations. For City-hosted events, the City should move toward centralizing food and drink concession areas in fewer locations to maximize food waste diversion.

[12] "Special Event Recycling and Waste Reduction Best Practice Guide", Louisville Metro's Solid Waste Management Services Division.

- **Institute vendor waste stations in concession areas accessible only to vendors.** The vendor waste station should include a station for unsoiled cardboard and paper, with instruction on acceptable and inacceptable cardboard and paper. Instruction should include information on the compostability of unbleached paper towels and napkins. Vendor waste stations should include signage that is clearly labeled with icons or images to encourage proper disposal. On the day of the event, Kingston staff or attendee waste station volunteers should meet with vendors to review vendor waste stations guidelines. These stations should not be managed by attendee waste station volunteers.
- **Establish a volunteer program for attendee waste station management at events.** Volunteers are typically called Green Team members, Compost Guides, or Waste Ambassadors, for example. They are also recommended for events at which only recycling and refuse will be collected as waste ambassadors can reduce the level of contamination that has prevented collected recyclables from being recycled. As the City's appointed volunteer committee members cannot be expected to serve as waste station volunteers in addition to their existing responsibilities, the City should consider hiring college or high school students to serve in this capacity. This option could also meet the City's social justice goals if high schools in lower wealth communities are encourage to apply. The City can consider providing waste station volunteers to non-hosted City events at a cost to the event or require that the event provide their own waste station volunteers.
- **Develop a Volunteer Waste Station Guide.** The Guide should outline in detail the content that can be included in each waste station's bins and how to engage with the general public in a non-confrontational manner. The Guide should be periodically updated in partnership with UCRRA and the City's composting entity. Instituting behavior change at events will require repeated and regular engagement with event attendees.
- **Locate clearly identified waste stations for event attendees in highly visible and convenient locations with high volumes of waste generation.** This includes near food and drink concession areas, picnic areas, restrooms, entrances, and exits.[13] Each waste station should be clearly marked, with colorful and clear signage identifying the content to be placed in each bin. Only enough words should be used to clarify the icons or images that will direct proper waste placement. This serves to enforce the information that waste station volunteers may, or may not, have a chance to convey to event attendees.
- **Implement organics collection at municipal recreation facilities for events organized by large entities.** Rental application data analyzed over a four-year period from 2016 thru 2019 revealed that large entities hosted events anticipating 48,305 attendees across 220 applications. Large attendee events can produce a significant amount of food waste, which represents a high disposal cost by weight. Large entities typically have more organizational capacity and are often repeat users of the City’s recreation facilities; both traits are beneficial for the implementation of a targeted organics collection program as they minimize the City’s administration burden. Examples of large entities include Unity in the Community and Drum & Bugle Corp organizers, Kingston schools, and Kingston Recreation Department summer programming.

[13] “Special Event Recycling and Waste Reduction Best Practice Guide”, Louisville Metro’s Solid Waste Management Services Division.

- **Establish an organics collection pilot program at select municipal recreation facilities for events organized by individuals.** During the same period analyzed, events organized by individuals submitted 589 applications that reported an expected attendance of 24,910 persons. While many applicants may be repeat users of the City's recreation facilities, the number of applicants represents over twice the number of applications submitted by large event organizers. This presents a significant administration burden for City staff's program implementation with regards to, in particular, educational engagement around contamination reduction. The City should consider establishing an organics collection pilot program for select municipal recreation facilities rented by individuals. The pilot program should be implemented at a minimum of two of the recreation facilities receiving the highest number of applications: Hasbrouck Park Stone Building, Forsyth Park Pavilion, and Kingston Point Beach Pavilion.
- Recommendations related to the application process and use of ActiveNet are discussed in "Recommendations from Events Staff" and "Recommendations from Recreation Facilities Waste Assessments".

E. RECOMMENDATIONS ON FOOD WASTE PROCESSING

E.1. RECOMMENDATIONS FROM COMPOSTING FACILITY SITE VISITS

- **The City should carefully consider selection of a local facility to process its food waste.** As part of this Study, the Kingston Transfer Station and other potential City properties were determined to be inappropriate for a municipally managed composting facility. Three composting facilities are operational in Ulster County within reasonable traveling distance to the City. Previously concerned with high contamination rates, the closest at approximately 9.4 miles round trip, UCRRA, had not been an option; currently, UCRRA has indicated an interest in accepting the City's food waste and charges $20/ton for food waste, a price noted for commercial source separate food waste. UCRRA's compost is marketed to meet the US Composting Council's STA, is STA Certified; UCRRA accepts BPI compostable products. The next closest facility at 25.13 roundtrip miles is the Town of New Paltz Zero Waste Program facility, which charges $40/ton of food waste and permits products labeled compostable. The last facility, Greenway Environmental Services, located 40.53 miles roundtrip, also charges $40/ton; Greenway prefers to not take any compostable plastics, but will accept PLA compostable serving ware if needed. A contractual relationship with any composting facility should clearly outline what will be prohibited by the facility to ensure that the City is not detrimentally impacted by unexpected contamination fees.
- **The City should consider unveiling a food waste drop-off program and pilot curbside food waste collection program.** The operators of the Village of Scarsdale's Food Scrap Recycling Program firmly place their program's success in a consistent, multipoint education and outreach program that can only be successfully implemented through incremental food waste collection roll-out. Good integration with Village staff and a committed volunteer group are also key to the Village's success as this capacity allows for program participants to be properly informed of expectations. The Village is one of the few municipalities from which UCRRA accepts food waste, which is a testament to the Village's success.
- **The City should consider bulk purchasing residential composting kits that can be sold at cost to the City's residential food waste curbside collection program.** The Village of Scarsdale Program operators recommend providing residents with kits to make their integration and

participation in the program easy. Doing so is also beneficial, in particular, with regards to bin liners to ensure that the product purchased, in this case given the Village's relationship with UCRRA, is BPI certified. Residents are likely to purchase liners that claim to be compostable but are not given the lack of regulation around the compostable claim.

E.2. RECOMMENDATION FROM HAULERS

- **The City can consider enlisting the services of local haulers for either curbside food waste collection or collection at drop-off sites.** While concerns have been raised about staff capacity to manage curbside collection, at the time of these conversations, the City was interested in managing collection of its food waste. As of the publication of this plan, the preference for processing food waste by DPW has shifted to external processing. Alternatives do exist and are available from Royal Carting Service Company for collection from drop-off sites (four 35-gallon lidded carts collected at a monthly rate of $1,126.00 plus $20.00 per tipped cart) and C.R.P. Sanitation for curbside and drop-of site collection (drop-site collection quote: $500 per month for once weekly pick up of up to 10 toters of compost).

E.3. RECOMMENDATIONS ON COMPOSTING TECHNOLOGIES

- **Develop a residential composting technologies guide for residents as part of a curbside food waste collection program.** Research revealed the many options for residential composting, including indoors and outdoor options, electric and manual. Depending on the City's collection schedule for food waste, many residents may prefer to remove their food waste more readily.
- **Develop a small commercial composting technologies guide for small commercial businesses as part of a curbside food waste collection program.** While the options for small scale composters were fewer, some viable options can be provided on program roll-out for consideration by small commercial businesses, and food businesses, such as restaurants, in particular. The cost for some of the technologies may be cost prohibitive for individual businesses, but a technology shared by a few businesses may be more attractive.
- **The City should continue to consider composting technologies at the municipal scale.** Despite the inability to identify a location for a municipal-scale composting facility, the City should continue to consider these technologies, in particular, EASPs, due to the lower implementation costs. Bringing the management of a municipal scale composting facility home would allow for greater flexibility over contamination concerns and acceptable compostable products.

E.4. RECOMMENDATIONS ON COMPOSTING SITES IN KINGSTON

- **The City should continue to reassess locations deemed unfeasible for an extended aerated static pile composting system.** A number of sites considered were of sufficient size for an EASP system, but were eliminated from consideration due to conflicts with nearby land uses. Overtime, should those land uses no long present a conflict and should the composting facility relationship prove to be financially or logistically challenging, it would be beneficial for the City to be prepared with an alternative location for a municipally managed composting facility. Recent recommendations from the NYS DEC are encouraging municipally managed composting facilities.
- **The City should unveil locations suitable for composting-related activities as part of its food waste collection program.** Eighteen locations were identified as suitable for neighborhood

composting, food waste drop-off, and/or compost distribution. The locations are distributed throughout the City in all but two of the least populated wards and are accessible to the various ethnic groups that reside in the City. Locations such as these allow for the reinforcement of the existing sense of community. All locations were determined to be accessible by DPW and/or Park & Rec vehicles.

- **The City should engage local, experienced companies in establishing neighborhood composting and food waste drop-off sites.** Both efforts require engagement with community members and experience with the logistics of establishing these composting related activities. A local small-scale hauler, CCC, has significant experience with both activities. Royal Carting Service Company and C.R.P. Sanitation are available to provide food waste collection from drop-off sites, but the City would still need expertise in establishing the community and volunteers needed for well managed neighborhood composting and drop-off sites.

E.5. RECOMMENDATION ON COMPOSTABLE PRODUCT OPTIONS

- **The City should inform the Kingston population of the compostable products available.** The education and outreach effort of the City should include informing the Kingston population of the available compostable products that are truly compostable and less or non-toxic. The market is inundated with products claiming to be compostable but that do not actually meet the compostable requirements. The market is also filled with products falsely claiming to be non-toxic. The City will do its residents a great service by providing them with the information needed to make sound purchasing decisions. From this Study's research, the City can also create a guidance document or webpage connecting constituents with legitimate products.

F. RECOMMENDATION FROM GHG EMISSIONS ANALYSIS

- **The City should compost its food waste based on the annual estimated reduction in greenhouse gas emissions alone.** The positive climate impact from diverting food waste from the City's waste stream is clearly shown in Table 41. Impact from Implementing the Kingston Organics Diversion Program. Whether one most easily visualizes the equivalent GHG emissions reduction in barrels of crude oil not used or passenger vehicles miles not driven, the positive environmental and health impact to the Kingston community is clear. The benefits also reach beyond the City given the reduction of food waste transport to Seneca Meadows and the avoided emissions along the way from the reduced need for transport.

G. RECOMMENDATION FROM COST BENEFIT ANALYSIS

- **The City should compost its food waste based on the anticipated cost savings from tipping fees alone.** This Study presented a very conservative cost benefit analysis as a baseline for diversion program development purposes. At minimum, based on a conservative estimate of food waste diversion, the City can expect to save $119,341.11 annually. These funds can be used to start a pilot program, with additional savings garnered as the program expands and the City exceeds the conservative participation rates calculated by this Study. The aggressiveness of the City's approach to its food waste collection program – the level of education and outreach, staff engagement, and pilot expansion – will be determinant of the City's true cost savings from its program. Given Kingston's success in other energy and environmental related

projects, this Study anticipates strong program participation from the Kingston population at program onset.

H. RECOMMENDATIONS FROM CASE STUDIES

- **Consider the creation of an opt-in curbside organics diversion program with a plan and timeline for mandating organics diversion across City residences and businesses.** A curbside program could include offering reasonably priced starter kits for residents, including a kitchen pail, as part of the public outreach and education campaign. Requiring food scraps to be bagged, particularly during the winter months to prevent material freezing to the bin, should also be considered.
- **Consider offering multiple sizes of curbside bins, no smaller than 13-gallon capacity if yard waste is not allowed in the bin, and no smaller than 20 gallon capacity, and perhaps larger, if including yard waste in the program.** However, the bins chosen should take into account that Kingston residences already have three bins and space is limited and ensure the bins are not too large. Depending on the composting facility, yard waste of a certain size (length and diameter) and weight could be placed in the curbside bin.
- **Consider right-sizing collection bins, offering trash pickup every other week, and perhaps charging more for a larger bin size or trash pickup more often.** There are two potential options for Kingston related to this recommendation, as the City currently does not charge for refuse and recycling pickup for residences. First, Kingston could maintain the current structure but cease offering weekly refuse pickup to incentivize using the compostable bin for food scraps, which would be picked up weekly. This would work best after the mandate goes into effect. Second, Kingston could create a monthly fee structure for refuse collection and offer cheaper rates for smaller refuse bins or collection less often. This would further incentivize organics diversion and recycling.
- **Consider mandating organics diversion through an ordinance.** After the opt-in program phase, consider creating a concise and clear residential ordinance based on Seattle, which has its own sanitation department do the collection and therefore is most similar to Kingston's model. There are draft ordinance changes in this Study in "Municipal Code". Additional ordinance changes include requiring that private haulers offer organics diversion to those they service. Phase in organics diversion requirements for businesses over time, based on NYC, including those with private haulers.
- **Consider mandating organics diversion at events.** Kingston may consider mandating organics diversion for events hosted at City properties and requiring a permit. This could be accomplished with simple edits to the special event application form already in use by Kingston, which already mandates recycling and refuse collection for event producers. Kingston may also consider providing fact sheets, signage, etc. to event producers when they apply for a permit. Additionally, Kingston may consider implementing additional requirements, such as the creation of a waste plan or review of content, for event producers before they are issued a permit. Kingston may also consider an additional complementary ordinance for businesses and events targeting takeout containers that requires they be recyclable or compostable, to increase diversion. Draft ordinance changes are found in "Municipal Code".
- **Consider updating the DPW waste management webpage to reflect best practices from the case studies reviewed and create collateral materials to assist residents and businesses to effectively sort their waste.**

I. RECOMMENDATIONS ON MUNICIPAL APPLICATION OF FINISHED COMPOST

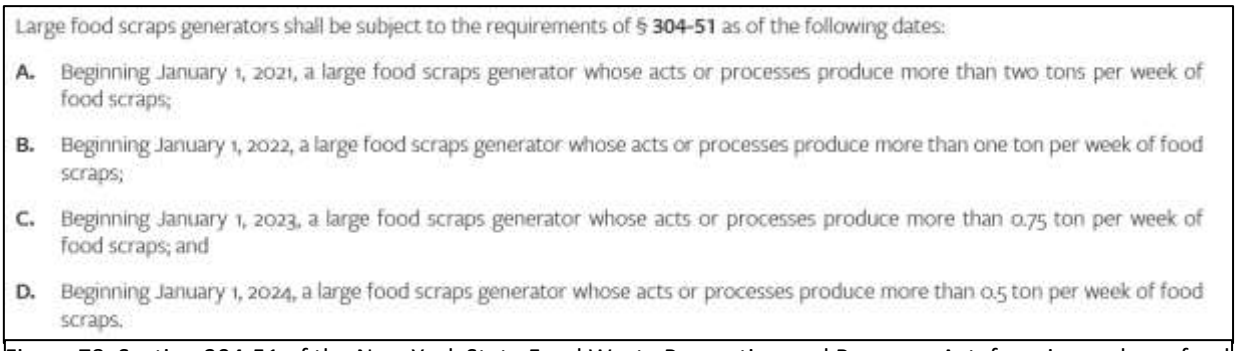
- **Utilize compost more regularly for its municipal operations.** As described in "Background", there are significant benefits for utilizing compost in landscaping activities, including the types of landscaping activities that municipalities engage in. The following is a representative list of potential compost uses within the City's municipal operations:
    - as cover on bioswales on Broadway, Kingston Point, Uptown parking lots, and Midtown parking lots;
    - as seed cover when seeding park lawns and ball fields;
    - backfill mix for planting new street and park trees and shrubs; and
    - in landscaped areas at City Hall, the Police Department, Dietz Stadium, landscaped parks, and other landscaped facilities.
- **Implement an ordinance to mandate the use of compost for its operations.** NRDC's sample legislation, described in Municipal Use, is an example that prioritizes compost usage for municipal public works operations while also not placing an undue economic burden on the municipality. The City should research and secure a source for reasonably priced compost before implementing such a policy.
- **Offer compost giveback to residents as a way for the community to see the results of their organics diversion**. This giveback, detailed further in Community Use, could be formulated as either regularly available year-round or seasonally available at the transfer station or hosting a few days a year as giveback events. The best format most likely depends on the location of the compost processing facility. If the processing is contracted out, givebacks hosted as events may make more sense than constantly having compost available to residents.
- **Write into the vendor contract a set amount of compost to be returned to the City.** If Kingston pursues contracting out of organics processing, Kingston may wish to consider including a compost return clause into the vendor contract to enable the above three actions to take place.

J. RECOMMENDATIONS ON ORGANICS DIVERSION FROM COMMERCIAL FOOD BUSINESSES

- **Phase in commercial collection in combination with Ulster County legislation.** New legislation from the State of New York and from Ulster County, the Food Waste Prevention and Recovery Act,[14] requires food scrap recycling and composting at a certain number of large facilities. The requirements for Ulster County, being more restrictive, are shown in Figure 78. Kingston has the option of applying this requirement at smaller restaurants and food establishments as well, perhaps at an accelerated timeline beyond the Ulster County legislation or in combination with it. In conjunction with a residential opt-in program, Kingston could use a phased-in approach to bring in larger restaurants and retail locations first that might not already fall under the State or Ulster County legislation, and then smaller restaurants and retail locations. A phased approach will serve to address the largest generators first, establishing effective educational tools, protocols and procedures, both for the City and the establishments, before then rolling out the implementation to all small establishments. This approach could be pursued through either a

[14] "Food Waste Prevention and Recovery Act", Ulster County.

pilot program, or an initial voluntary opt-in phase for commercial customers whose refuse is already collected by the City. A pilot approach would allow for the City to address


Large food scraps generators shall be subject to the requirements of § **304-51** as of the following dates:

A. Beginning January 1, 2021, a large food scraps generator whose acts or processes produce more than two tons per week of food scraps;

B. Beginning January 1, 2022, a large food scraps generator whose acts or processes produce more than one ton per week of food scraps;

C. Beginning January 1, 2023, a large food scraps generator whose acts or processes produce more than 0.75 ton per week of food scraps; and

D. Beginning January 1, 2024, a large food scraps generator whose acts or processes produce more than 0.5 ton per week of food scraps.

Figure 78. Section 304-51 of the New York State Food Waste Prevention and Recovery Act, focusing on large food scraps generators.

implementation challenges related to food waste diversion, storage, collection, or location. The gradual phase-in of commercial collection should be carefully timed and planned, with initial participants identified ahead of time, stakeholder engagement done with the organizations available to accept donated food, and a set number of months or years for each phase.

- **Dedicate staff time of a recycling coordinator to develop and provide education and guidance to businesses.** The Commercial Food Waste Reduction Guide outline in this section can serve as a starting place for businesses to consider the food waste diversion and composting practices most appropriate to their particular needs. However, there remains an important role for dedicated staff to develop and provide education and guidance to businesses, such as hands-on coordination of best practices, implementation plans, signage templates, assistance with communication, troubleshooting, assistance with training staff, advising on issues of non-compliance, management of composting program funding and costs, and education on reducing contamination. The City has the option of considering a one or two-year appointment to oversee commercial food waste collection, after which duties could be transferred to existing staff.
- **Aid commercial organics collection implementation.** There are a number of tools available to encourage the adoption of composting practices at commercial establishments. The City has the option of applying for a NYS DEC grant for Recycling Coordination and Education.[15] This grant could partially fund the printing of standardized composting signs or purchase of appropriately sized and colored bins for distribution as well as the development of educational tools and resources and enforcement strategies.

[15] "Grants for Recycling Coordination and Education Projects", NYS Dept. of Environmental Conservation.

READING THIS STUDY

This Study provides a comprehensive overview of composting options available to the City of Kingston, ranging from available composting facilities, curbside collection materials, compostable products, composting technologies, companies providing food waste hauling services, to best practices from 11 communities throughout the country. The research for this Study was conducted between 2018 and 2023; the timeframes for certain research, such as interviews and site visits, are provided in the respective sections; all other research is current as of 2022/2023.

This Study is organized as follows.

- The Introduction provides the intent for this Study.
- The Local Context Analysis section covers a number of important local considerations.
    - Stakeholder Feedback is provided from City of Kingston staff and appointed volunteers as well as the Ulster County Department of the Environment and the Ulster County Resource Recovery Agency. Stakeholder feedback was also obtained through a survey of residents and small food producing businesses. Information from composters operating in the City is also provided.
    - Waste Assessments conducted on municipal buildings, municipal recreations facilities, and events are discussed. The waste assessments included waste audits and facility walk-throughs, as well as compiled information from records analysis. Detailed data collected and images are provided.
    - Food Waste Estimates developed are then discussed, with estimates provided for municipal solid waste, food waste producing commercial establishments, and events.
    - Food Waste Processing research is presented on three Ulster County composting facilities as well as one in Westchester County, and a discussion of composting options at the City of Kingston Transfer Station. Information obtained from interviews with potential haulers is presented. This section also provides information on available composting technologies, the results of the in-depth site analysis conducted on potential composting facilities within the City, and compostable product options.
    - The Greenhouse Gas Emissions Analysis details the projected reduction in metric tons of carbon dioxide equivalent from diverting a conservative estimate of food waste. Two models are discussed for the emissions reductions for diverted food waste and one for reductions resulting from vehicle miles traveled.
    - The Cost Benefit Analysis section details the projected cost savings from diverting a conservative estimate of food waste.
- The Best Practices section provides a high-level overview of the best practices from 11 communities in the United States known for their successful diversion programs. Communities with population sizes similar to Kingston are included as well as smaller and larger communities. This section also reviews best practices for Organics Diversion at Events, Municipal Application of Finished Compost, and Organics Diversion from Commercial Food Businesses.
- The Implementation Recommendations section begins with:

    - Recommended Strategies, which is a complete compiling of all Study recommendations found throughout the various report sections. A high-level overview of recommendations is provided in the Executive Summary.
    - The Phased Implementation section provides details on the recommended three-phase roll-out of the program over a three-year period. Estimated costs based on the proposed phased roll-out are provided.
    - The Municipal Code section outlines recommendations to Kingston's Solid Waste Code should Kingston determine that mandated organics diversion would be beneficial. Additional draft ordinance language is provided on compostable / recyclable take-out containers and their disposal as well as a draft ordinance for Organics Diversion at Special Events and a Compost Procurement Policy outlining the uses of compost in municipal operations.
    - The Municipal Organics Collection – Public Meetings section outlines recommendations for collection of food waste from meetings held at Kingston buildings by staff and with the invited public.
    - The Municipal Tracking of Organics Waste Collection section provides an explanation of the tracking methodology that can be extended from recycling and refuse collection for food waste collection.
    - The Residential Bin Distribution Plan outlines the roll-out of bins and related materials for a residential roll-out according to the Phased Implementation recommendations.
- The Study ends with a listing of available Funding Opportunities to support the City's roll-out of a food waste diversion curbside collection program.

Given the comprehensive nature of this Study, sections in the Study are expanded upon in a companion document titled Kingston Organics Diversion Study Appendices. The Listing of Appendices provides the eight related appendices, with the sections in this Study referencing the relevant Appendices to be consulted. The hyperlinked table of contents in both the Study and Appendices will facilitate review of these documents. The Appendices are organized as follows:

- Appendix A – Kingston Compost Survey provides the detailed analysis conducted from the survey responses received by residents, small commercial businesses, and food waste producing businesses. The Survey Instrument is provided.
- Appendix B – Waste Assessments provides background on the Waste Sort Process for municipal buildings, municipal recreation facilities, and events. Photographs and waste sort reports are provided as well as the details from the findings of the facility walk-throughs. Staff were interviewed during the facility walk-throughs.
- Appendix C – Food Waste Estimates provides detailed information on the metrics collected and conversion factors developed, where needed, for estimating food waste diversion potentials for municipal solid waste (municipal waste, residential waste, and small commercial food waste producing businesses) and events.
- Appendix D – Site Visits provides information only on the Ulster County Resource Recovery Agency visit, with the other site visits covered in this Study due to their higher relevance to Kingston's curbside collection options.
- Appendix E – Demographics of Composting Locations outlines the research conducted to ensure that small scale composting locations would be available to largely the entire Kingston population, covering all socioeconomic areas of the City.

- Appendix F – Bins, Liners, & Totes provides a synopsis of the research conducted on these items readily available for purchase. Selections are broad, pointing to the expansion of the market.
- Appendix G – Greenhouse Gas Emissions Analysis outlines emissions reductions resulting from the institution of a curbside food waste collection program.
- Appendix H – Case Studies provides a synopsis of the following seven areas researched from the 11 best practice communities: ordinance language regarding organics diversion, fees, fines for non-compliance, events practices, practices with businesses, educational and outreach materials used, and food waste diversion outlined in existing plans. The high-level overview of this research is included in this Study in the Case Studies section.

INTRODUCTION

Compost, or "black gold", is a valuable commodity that returns nutrients to the soil while increasing porosity. Compost starts as food scraps in your home or business kitchens, restaurant and take-out leftovers, and edible but expired or forgotten food. It is mostly a wasted resource. For City of Kingston residents and small commercial businesses in 2022 alone, 8.76 tons, or 17,512 pounds, of food waste, was transported daily by truck with other Ulster County waste to the Seneca Meadows Landfill – a 480 mile, 7.5 hour round trip. The annual impact of transporting Kingston's food waste to Seneca Meadows amounts to over 66,350 miles traveled, over 9,200 gallons of diesel fuel consumed at a cost of over $32,000, and over 1,000 hours spent driving. The Kingston Organics Diversion Study demonstrates the City of Kingston's commitment to addressing the waste of this commodity as well as improving the environmental and health-based quality of life for Kingston residents and businesses.

The Kingston Organics Diversion Study demonstrates the City of Kingston's commitment to improving the environmental and health-based quality of life for Kingston residents. The City's primary goal in developing the Study is to reduce landfill and transportation costs from the disposal of food waste as well as GHG emissions. The Study's comprehensive approach is likely to serve as a model for other communities of similar size and demographics as much of the information will be relevant and replicable in other communities. Additionally, the details revealed from the research of internal organizational dynamics and structures will provide a useful starting point for other communities' consideration of the modifications needed in their municipalities when pursuing a community-wide composting program.

In preparing this Study, City staff and the Hudson Valley Regional Council (HVRC) researched the availability of other similar strategic plans in New York State (NYS), using the material available for guidance. The paucity of comprehensive diversion plans reaffirmed the value that this plan can bring to other communities considering organics diversion programs. Further, besides pilot projects in large cities like New York City and small operations at transfer stations, few communities in New York are implementing full, jurisdiction-wide organics collection.

The Kingston Organics Diversion Study serves as a model for the efficient execution of multiple CSC Certification Actions. The Study builds on previous investments while also improving previous initiatives for the City. The City is a Silver Certified Climate Smart Community, the highest level currently achievable in the State. With the implementation of the proposed actions in this Study, along with several others the City is currently pursuing, Kingston will be poised to resubmit for a higher certification, advancing the State's goals, and the City's goals. Further, in the last five years, the City of Kingston, with over $1.1 million in support, has invested in multiple facets of municipal waste reduction:

- purchasing and providing recycling totes to every residence in the City
- retrofitting waste hauling trucks to accommodate the new totes
- purchasing additional waste hauling vehicles to accommodate the increase in recyclables collected

- purchasing backyard compost bins for distribution to several hundred residents and providing associated educational programming
- purchasing and installing public street recycling and refuse cans in all City business districts

PROJECT PARTNERS

To develop the City of Kingston Organics Diversion Study (Study), the City partnered with HVRC. HVRC staff has been actively engaged in organics management, food recovery, and recycling in the region. HVRC coordinates an active and longstanding regional Materials Management Working Group consisting of county solid waste professionals and recycling coordinators in the Mid-Hudson Region as well as materials management staff of the New York State Department of Environmental Conservation (NYS DEC) Region 3. For this project, HVRC served as a consultant with the City of Kingston for their work on the project.

The Study involved coordination by local government with county government, as well as with HVRC and regional waste management authority. This coordination was essential to the project as the reduction in waste will need to be managed with the Ulster County Resource Recovery Agency and the County of Ulster, as the City of Kingston is one of the larger sources of waste in the County. Additionally, the collaboration with HVRC will result in the sharing of information and best practices with other municipalities in the region. Finally, this Study directly aligns with the Mid-Hudson Regional Sustainability Plan, which will contribute towards advancing the region's goals.

HISTORY OF KINGSTON MUNICIPAL SOLID WASTE

The need to address emissions from waste production in the City has been top of mind for over a decade. Per the City of Kingston's first GHG Emissions Inventory, in 2010 the Kingston Department of Public Works (DPW) collected 13,827.10 tons of material: 8,768.80 tons of 'waste', 1,538.49 tons of curbside recycling and 3,519 tons of 'other' recyclables. All trash was sent to Seneca Meadows Landfill via long haul trucks, resulting in transportation and decomposition emissions, and compromising local and regional air and water quality. The waste collected by DPW in 2010 will generate 1,121 tons of CO_2e as it decomposes. The total GHG emissions associated with the collection, management, transport and disposal of solid waste in 2010 for Kingston was 1,693 tons of CO_2e. This Inventory accounted for Scope 1 and Scope 2 GHG emissions, which includes direct and indirect emissions associated with managing our waste. These statistics also form the baseline from which the City will measure the GHG emissions reductions from implementation of a City food waste collection program, achieved through the reduction of total VMT from the transport waste to Seneca Meadows landfill and by reducing total waste produced through organics diversion. The up-to-date emissions information is provided in this Study.

STUDY INTENT

This Study provides the City with recommendations for how to greatly increase government efficiency and sustainability, and hopes to serve as a model for other local municipalities. By establishing an approach to minimize organic waste and increase diversion, the City is informed on how to best proceed with allocating personnel and the municipal budget to decrease GHG emissions produced by long hauling waste to Seneca Meadows, improving local and regional air and water quality. Reduction

in waste could decrease tipping fees for waste disposal, plan for creating usable soil amendments, and propose methods to generate revenue for the City. This Study serves as the most efficient way to determine if these practices are cost effective or prohibitive, best practices for implementation, and plan for a successful transition to organics collection.

Objectives of the Organics Diversion Study are:

- Reduce waste generation;
- Decrease the impact of materials transportation for disposal/recovery; and
- Increase composting.

Fulfillment of these objectives will result in a meaningful reduction of GHG emissions through the reduction of VMT, removal of food waste from the landfill, and the sequestration of carbon by utilizing composted organics in landscape enhancements.

Additionally, the Study provided the opportunity to engage and inform City staff and the public about composting options, positioning the City for a smoother transition to increased waste reduction and reduction in GHG emissions.

ALIGNMENT – CITY PLANS AND THE NYS CSC PROGRAM

In September 2012 the City of Kingston adopted the first Kingston Climate Action Plan. Kingston's Climate Action Plan established a goal of 20% reduction in energy usage and GHG emissions by 2020 by reducing waste generated in the City and from government operations as well as by promoting waste reduction and composting, and reducing the GHG emissions associated with transportation and disposal of waste. The Climate Action Plan outlined that waste reduction would be established through, among other things:

- a Materials Management Plan, waste reduction and recycling standards for local buildings and development,
- considering the feasibility of instituting a curbside food waste collection,
- encouraging zero waste event planning,
- promoting the use of compostable service ware and utensils in schools, restaurants, City offices and events,
- partnering with local businesses to advance recycling and composting,
- developing additional composting in municipal parks,
- promoting backyard composting,
- working with Kingston City School District to reduce waste, initiate/expand recycling and composting,
- distributing updated waste reduction, recycling and composting information to all residents and properties serviced by the city,
- establishing procedures to conduct periodic waste composition analyses (waste audits) to track total municipal government waste generated, recycled and disposed of by type,
- developing a City Government Waste Reduction Policy,
- exploring the feasibility of composting food waste at select municipal facilities,
- using compostable service ware and utensils at City sponsored events and reusable service ware and utensils in day-to-day operations.

In 2021, the City created the City of Kingston Climate Action Plan 2030. The report contains the Managing Resources Sustainably section with strategies to reduce emissions associated with food production, consumption, and waste disposal, including establishing organic waste collection. The strategy specifically mentions enacting the final recommendations of this plan.

Kingston's Comprehensive Plan 2025 also addresses the zoning implications for composting in specific strategies. Kingston is currently undergoing an updating of its zoning, moving to a form-based code. The following recommendations were included in the 2025 Comprehensive Plan:

- Incorporate urban agriculture into the new zoning code. Broaden use districts to include small residential lots, commercial, mixed-use, manufacturing, and waterfront districts.
- Incorporate urban agriculture definitions into the zoning.
- Allow "Market Gardens" in the new zoning.
- Incorporate appropriate accessory structures and uses, parking and loading, screening, appearances, as well as related ordinances to include composting, garbage (solid waste), weeds, municipal water, prescribed burning, and gardening in municipal parks.

The City of Kingston is a Silver Certified Climate Smart Community. The execution of relevant additional Certification Actions in the CSC Program will bring Kingston closer to achieving even higher certification and support its recertification application in 2025. The strategy to develop the Organics Diversion Study addresses the goals established above and supports the completion of six Certification Actions under the Pledge Element 5 – "Use climate-smart materials management". The City of Kingston Organics Diversion Study provides a plan and strategy, including determining feasibility and budgets associated with implementing the six Certification Actions:

1) Government Solid Waste Audit;
2) Organic Waste Program for Government Buildings;
3) Recycling Program for Public Places & Events;
4) Residential Organics Waste Program;
5) Compost Bins for Residents; and
6) Organic Waste Management Plan.

Subsequently, the City will be able to implement the recommendations included in this study immediately thereafter either through the City municipal budgetary process or by pursuing additional federal or state grant funding.

LOCAL CONTEXT ANALYSIS

The recommendations developed for the Kingston Organics Diversion Study are based on an in-depth analysis of the City's local context. This section presents the feedback obtained through stakeholder input as well as analysis from waste assessments conducted, food waste estimates developed, and food waste processing options explored. Clarity on the local Kingston context provides the backdrop for a plan that is uniquely Kingston, but also informative to the region at large for municipalities of Kingston's size and demographics.

1. STAKEHOLDER FEEDBACK

Stakeholder input was obtained through interviews, public meetings, site visits, and a public survey. Interviews were conducted through meetings with Kingston municipal departments, including the Department of Public Works (DPW) staff, Kingston events staff, Kingston Fire Department firefighters, as well as staff across various departments during the facility walk-through component of the municipal facilities waste assessment.[16] Additional input was obtained during meetings with the appointed members of the Kingston Conservation Advisory Council (KCAC) and staff of governmental entities external to Kingston, the Ulster County Resource Recovery Agency (UCRRA) and Ulster County Department of the Environment (UCDOE). Business community input was obtained from a joint public meeting of the Business Alliance of the Kingston (BAK) and the Kingston Uptown Business Association (KUBA). Additional business community input was obtained by a survey made available to small food businesses. Input from residents was also obtain through this survey as well as from Facebook postings on the City's Facebook page. Community Compost Company, a regional company that collects food waste, was also interviewed given their food waste collection engagement with Kingston residents and small businesses.

A. MUNICIPAL

A.1. KINGSTON CONSERVATION ADVISORY COUNCIL

The below listed members of the KCAC met with HVRC staff on July 10, 2018. The meeting focused on presenting the scope of project. Three guests also attended: Tanya Garment, Hillary Harvey, and Randolph Horner.

- Betta Broad
- Emilie Hauser
- Lynn Johnson
- Kevin McEvoy
- Julie Noble
- Casey Schwarz
- Andrea Shaut (Common Council Liaison)

1. OVERVIEW

The Kingston Organics Diversion Study project was positively received by attending appointed volunteers. Appointed volunteers committed to their project volunteer roles as outlined.

[16] Stakeholder feedback obtained during the facility walk-throughs are found in the Waste Assessments section of this study.

2. RECOMMENDATION FROM KCAC

- **Include information on bins for in-home food waste collection, back yard compost bins, and curbside food-waste bins as part of the City's residential bin distribution plan.** Appointed KCAC and CSKC volunteers requested that this information be part of the informational materials distributed to residents. The availability of this information would allow residents to independently determine how to best divert food waste in their household.

3. KINGSTON CAC BACKGROUND

Created under Resolution 180 of 2008, the mission of the KCAC is to "Ensure the conservation of the City of Kingston's natural resources and the enhancement and protection of its environment while fostering unified action on environmental matters."[17] The KCAC is an appointed volunteer board that serves as an advisory body to the Planning Board, Common Council, and Mayor.

4. KINGSTON CAC INPUT

KCAC appointed volunteer input focused, in order of conversation, on project scope of work, waste sorts, and compost bin distribution plan information. A synopsis of the input shared is listed below by topic area.

- Scope of Work: Appointed volunteers reacted favorably to the project scope of work.
    - The scope was discussed, including the KCAC's roles as reviewers, connectors, and meeting coordinators. All in attendance were generally in agreement with the scope.
    - An appointed volunteer expressed their interest in including educational institutions in the project scope. It was explained that educational institutions were not included given that they do not receive municipal waste collection. It was also clarified that institutions would not be included as part of the commercial analysis, which will specifically focus on small food-waste producing businesses, like restaurants and coffee shops.
- Waste Sort:
    - An appointed volunteer expressed their belief that the government waste sort should be conducted by City staff rather than with KCAC or CSKC assistance or support. The appointed volunteer also suggested the addition of a waste sort for residential properties. This request was not added to the project scope as it was outside the scope.
    - Appointed volunteers discussed their availability for municipal buildings and recreation facilities waste sorts as well as their preferred time of year for conducting the sorts.
- Compost Bins Distribution Plan: Appointed volunteers requested confirmation and it was confirmed that the distribution plan for compost bins for residents would include information on bins for in-home food waste collection, back yard compost bins, and curbside food-waste bins.

A.2. CITY OF KINGSTON DEPARTMENT OF PUBLIC WORKS

The below listed DPW staff met with Project Coordinator Julie Noble, City of Kingston Sustainability Coordinator, and Carla Castillo on September 26, 2018. The meeting focused on explaining the scope of the project and obtaining input on the challenges identified by DPW staff.

- Edward Norman, Superintendent

[17] City of Kingston, *Conservation Advisory Council*, October 12, 2020.

- Ryan Coon, Deputy Superintendent
- Mary Jo Wiltshire, former Operations & Finance Administrator
- Diane Bergquist, former Safety Officer
- Mike McCreery, former Laborer Foreman

1. OVERVIEW

DPW staff identified staffing capacity and source-separation of an additional waste stream as the most significant concerns associated with the implementation of a food waste recycling program. DPW would prefer City management of food waste recycling to avoid contamination fees experienced with recycling contamination at UCRRA. Education and outreach of Kingston residents and the business community was identified as a critical component to low-contaminant, source-separated food waste; this feedback is guided by ongoing contamination issues experienced with recyclables.

2. RECOMMENDATIONS FROM DPW

- **Reduce contamination rates with a fully developed education and outreach campaign.** DPW staff's experience with higher than anticipated tipping fees due to contamination with the City's recyclables informed their recommendation.
- **Include yard waste with food waste collection.** Not only is there precedence with local governments' acceptance of yard waste with food waste collection, it would streamline DPW's current yard waste collection and processing practices to include yard waste with food waste. The selected composting facility would need to accept combining these two waste streams for it to be implemented.

3. DPW BACKGROUND

The DPW webpage on the City of Kingston website states that DPW's workforce consists of approximately 71 persons who are overseen by the Superintendent of Public Works. The Department has nine divisions: Public Works Administration, Safety Division, Street Division, Sewer Maintenance Division, Sanitation Division, Waste Water Treatment Division, Fleet Maintenance Division, and Park Maintenance Division. The divisions are described in more detail on DPW's webpage.[18]

Kingston residents and the business community can easily access the refuse/recycling calendar in English and Spanish as well as refuse/recycling information on DPW's webpage. Informational hyperlinks are provided on the Sewage Right to Know Act, combined sewage overflow, an FAQ on snow removal, the City's snow plan, tote purchase requirements, and the State Pollutant Discharge Elimination System (SPDES) Permit report. Additionally, the webpage includes permits and regulations information on excavation, frequently asked questions and insurance requirements, sidewalk dumpster rules, sidewalk excavation application, street/sewer excavation application, street/sewer excavation rules, cutaway specs, and bluestone application. Parcel information is available via the City's online property information system,[19] which provides parcel information and allows constituents to request an inspection of a location or lodge a complaint. Last, contact information is provided for

[18] "Department of Public Works", City of Kingston, https://kingston-ny.gov/content/8399/8469/10411/default.aspx. Accessed October 2018.

[19] "Online Property Lookup", City of Kingston, https://www.kingston-ny.gov/propertylookup. Accessed November 4, 2022.

administration, the safety division, dispatcher, wastewater treatment division, and the solid waste management facility.

4. DPW INPUT

DPW staff input focused, in order of conversation, on staffing, recycling, education and outreach, yard waste processing, food waste recycling, and waste audits pointers. A synopsis of the input shared is provided below by topic area.

- Staffing: DPW is undermanned and underpowered. Staffing capacity and costs are a concern as DPW moves to implement dual stream recycling collection as required by the Ulster County Resource Recovery Agency.
- Recycling:
    - Recycling contamination is an ongoing problem. A higher contamination rate has been observed in rental units and multifamily units. Contamination rates are lower in owner-occupied multifamily units.
    - With the required reinstatement of dual-stream recycling, the City has had to increase the budgeted amount for tipping fees. Tipping fees are higher in part due to fines from recycling contamination (e.g., aspirational recycling, wet paper) and removal of previously recyclable materials (e.g., shredded paper).
- Education & Outreach: Extensive education of the public will be critical to a successful composting program. Source separation of another portion of the waste stream will require comprehensive education for successful source-separation of three waste streams: refuse, recycling, and compost. The inclusion of yard waste with food waste collection would be ideal.
- Yard Waste Processing: The City collects yard waste, brush, wood, and leaves (grass clippings, garden debris, small chipped branches, tree prunings, shrubs, large branches, and natural wood). Leaves are collected separately in the fall and are now taken to the City's Transfer Station at 380 Boulevard. All other yard waste is stored at the Transfer Station. Room for storage is minimal. Yard waste is ground using a grinder from Ulster County, when available.
- Food Waste Recycling:
    - At the time of this interview, it was indicated that the City would prefer to retain control over processing of Kingston's food waste into compost as a way of addressing the higher food waste standards required by UCRRA. As of the publication of this Study, the preference for processing food waste by DPW has shifted to external processing.
    - Food scraps collection is expected to be more than the volume processable by the wastewater treatment plant (WWTP).
- Waste Audits:
    - The largest amount of food waste volume from municipal buildings is anticipated from municipal fire houses and the Forsyth Nature Center. The Police Station and Court have a lunchroom, but no kitchen. These buildings are expected to be a large source of paper towels.
    - For waste sorts, nitrile gloves should be mandated and N95 masks and aprons or Tyvek suits should be offered.

A.3. ULSTER COUNTY DEPARTMENT OF THE ENVIRONMENT & ULSTER COUNTY RESOURCE RECOVERY AGENCY

Project Coordinator Noble met with UCRRA and Ulster County Department of the Environment (UCDOE) staff on February 20, 2020. The meeting focused on informing stakeholders of research conducted to date, discussing the City's consideration of a City-managed Extended Aerated Static Pile (EASP) System, and obtaining input.

- Amanda LaValle, former Director, UCDOE[20]
- Tim Rose, former Executive Director, UCRRA
- Charlie Whittaker, Director of Operations, UCRRA
- Angelina Brandt, Director of Sustainability, UCRRA
- Melinda France, former Recycling Educator, UCRRA

1. OVERVIEW

The stakeholders present appreciated the opportunity to provide input on the complete research conducted to date on the Diversion Project. The research presented was assessed to be very comprehensive. The input provided focused on various aspects of implementing composting programming as well as sharing of potential pitfalls. The stakeholders were very generous with their contributions and time toward the research presented.

2. RECOMMENDATIONS FROM UCDOE & UCRRA

- **Collaborate with local composting companies, such as Community Compost Company, to determine whether neighborhood composting can operate during winter.** UCDOE staff noted that in the case where neighborhood composting was infeasible during winter, a drop-off system would be a good alternative.
- **Build a robust team of volunteers to reduce contamination in the organics waste stream.** UCRRA staff noted the importance of volunteer participation in the low contamination rates seen from the Village of Scarsdale, a Westchester County community. UCRRA accepts the Village's food waste and attributes the low contamination rates to the extensive education and outreach component of their food waste collection program. The volunteer team would be critical in reducing plastic contamination in the organics waste stream, with is a common issue seen by UCRRA.

3. UCDOE BACKGROUND

The UCDOE[21] was created in 2007 under Local Law No. 17. It serves Ulster County by coordinating "environmental policy and resource planning within County government. Key areas of involvement include natural resource planning, natural resource inventory data management and creation, stormwater regulation compliance, support of County energy efficiency and green building infrastructure initiatives, and involvement in watershed planning issues."[22]

[20] Ms. LaValle is current Deputy County Executive of Ulster County.

[21] Background on UCRRA is presented in this section under Composters.

[22] Amanda LaValle, "2019 Annual Reports of the Executive Departments", Ulster County Department of the Environment, https://ulstercountyny.gov/sites/default/files/documents/environment/2019AnnualReports_Environment_extract.pdf. Accessed November 3, 2020.

4. UCDOE & UCRRA INPUT

UCDOE and UCRRA staff input focused, in order of conversation, on neighborhood composting, obtaining sources of carbon for aerated composting, drop-off sites, an initial discussion on Pay As You Throw, Kingston sanitation trucks, funding for staff and education, the Minneapolis composting program, contamination, and the Ulster County 2019 Food Waste Prevention and Recovery Act. A synopsis of the input shared is listed below by topic area.

- Neighborhood Composting: Composting during wintertime at neighborhood composting locations could be problematic. Recommend employing a drop-off system during the winter.
- Carbons, or Browns: Obtaining sufficient carbons, or browns, for composting was discussed, including the value of different types of browns.
    - UCRRA uses wood chips from County municipalities if delivered by the municipality to UCRRA. UCRRA provides yard waste grinding services for municipalities. If the municipality delivers the wood chips to UCRRA, fees are waived. If the municipality chooses to keep the wood chips, then various fees would apply.
    - UCRRA explained that grinding wood was preferable to grinding leaves as leaves are difficult to process. For an EASP operation, it would be ideal for a municipality to collect wood separately from leaves. Kingston separates wood from leaves.
- Drop-Off Sites: Drop-off sites are exempt from permitting requirements[23] as the food waste has been source separated. Transport restrictions may only apply to poundage at one or more tons, but residentially generated food scraps are exempt. Tompkins County has many community drop-off locations.
    - Collection of food waste could be done by attaching a 65-gallon tote to the sidewalk side of a sanitation truck. This would leave the hopper unaffected. A local carting company was discussed that had a front loader with a fixed container and an arm. The driver could assess contamination of food waste dumped into the container.
    - It was recommended that drop-off sites include a robust education component to reduce contamination.
    - Farmers markets are also viable drop-off locations, particularly when working with a local collection company, such as CCC[24].
- Pay As You Throw (PAYT):[25] PAYT was discussed as an effective program for incentivizing recycling of food waste and recyclables. The sale of tags for different waste streams could fund food waste collection, compliance, and education.
- Kingston Sanitation Trucks: All Kingston totes are RFID (radio-frequency identification) enabled. The sanitation trucks currently cannot read the RFIDs.
- Funding Staff: Staff for management of a composting program can be funded in part by the NYS DEC's grants for recycling coordination and education projects through the Municipal

[23] "Regulations for Organic Recycling Facilities, Transfer Facilities that Accept Food Scraps/Food Scraps Drop Off Spots", NYS DEC, https://www.dec.ny.gov/chemical/97488.html. Accessed November 2022. Transfer facilities or food scraps drop off spots that collect less than five cubic yards of food scraps/source separate organic waste per day are exempt from regulatory oversight per 6NYCRR Part 362-3.2(c). The full text is for 6NYCRR Part 362-3.2(c) can be reviewed at https://govt.westlaw.com/nycrr/Document/Id4d6a433dfe911e7aa6b9b71698a280b?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default).

[24] Community Compost Company and their services are discussed in depth in this Study in "Stakeholder Feedback", "Community Compost Company".

[25] PAYT is discussed in depth in this Study in "Case Studies".

Waste Reduction and Recycling Program (MWR&R Program[26]). This funding source is used by both UCRRA and the City of Kingston to support staff in the role of recycling coordinators.
    - The MWR&R Program provides assistance for recycling coordinator salaries and for municipal public education programs.
    - Applications are accepted annually August through October.
    - Approved applications are eligible for up to 50% of eligible costs, not to exceed two million dollars.
    - The MWR&R Program is a reimbursable grant; capital must be allocated up front by the awarded entity.
- Minneapolis Composting Program: The Minneapolis curbside collection program was highlighted as a program that requires food scraps collection city-wide, including schools. This program will be discussed in depth in Appendix H. Case Studies in this Study's Appendices.
- Contamination: Contamination is a significant problem with residential food waste collection. Plastic is a prevalent contaminant. Schools, restaurants, and institutions were identified as having lower contamination rates due to the ability to more easily manage the areas where food waste is produced. Low contamination rates become more important when aiming for a higher quality compost product.
    - The Village of Scarsdale, one of the few municipalities from which UCRRA accepts municipally collected food waste, provides low-contaminant food scraps due to the strong education and outreach component to their program.[27] Additionally, the Village has a robust team of volunteers and, in particular, two program leads who ensure that the program is well-managed.
    - It was recommended that the City of Kingston carefully consider the intended use for the final product to determine contamination tolerance levels and the types of contamination that would be acceptable.
    - It was noted that Community Composting Company is also very concerned about contamination levels, particularly plastics. The market is not very tolerant of plastic remnants in finished compost.
- Ulster County 2019 Food Waste Prevention and Recovery Act: Adopted as Local Law No. 5 of 2019[28] and amended as Local Law No. 6 of 2020,[29] this law focuses on the reduction of food waste from large generators. The Act uses the New York State Pollution Prevention Institute's Organic Resources Locator[30] to identify large generators of food scraps. The Act's definition of large generators changes over time, requiring food re-use or composting from large generators producing, at first, two tons per week to half a ton per week within a two-and-a-half-year

[26] "Grants for Recycling Coordination and Education Projects", NYS DEC https://www.dec.ny.gov/chemical/105613.html. Accessed November 2020.

[27] The Village of Scarsdale Food Scraps Recycling Program is discussed in depth in this Study in "Food Waste Processing", "Composting Facility Site Visits".

[28] "Proposed Local Law Number 5 of 2019, Food Waste Prevention and Recovery Act", Ulster County https://ulstercountyny.gov/sites/default/files/documents/Proposed%20Local%20Law%20No.%205%20of%202019%20-%20Composting%20By%20Large%20Generators%20AMENDED.pdf. Accessed November 2020.

[29] "Ulster County Food Waste Prevention and Recovery Act", Ulster County, https://ulstercountyny.gov/environment/food-waste-prevention-and-recovery-act. Accessed November 2020.

[30] "Organic Resource Locator", New York State Pollution Prevention Institute, https://www.rit.edu/affiliate/nysp2i/organic-resource-locator. Accessed November 2020.

timeframe. The Ulster County law includes hospitals and schools, which are exempted from the NYS Food Donation and Food Scraps Recycling Law,[31] and offers no exemption for distance. The NYS law regulates generators within 25 miles of an existing compost facility. UCDOE coordinates several of the outreach, education, and implementation tasks related to the Act and maintains a webpage[32] with guidelines, forms, and other resources for regulated food scraps generators in the County.

A.4. CITY OF KINGSTON EVENTS STAFF

Project Coordinator Noble met with various City of Kingston staff responsible for the management of events hosted or supported by the City on February 18, 2020. The meeting focused on informing stakeholders of findings from events waste sorts conducted and food waste collection projections for events; discussing recommendations for food waste collection for events and pavilions; discussing events application processes; and obtaining input on viability of food waste collection at events and pavilions.

- Lisa Bruck, former Parks & Recreation Clerk
- Summer Smith, Communications & Community Engagement Director
- Lynsey Timbrouck, Recreation Director
- Elisa Tinti, City Clerk
- Roy Verspoor, Mayor of Kingston Confidential Secretary

1. OVERVIEW

Events staff across various departments discussed various aspects of instituting a food waste collections program for events. Staff were generally positive about the prospect of program implementation but acknowledged engagement with vendors and organizers as important areas needing significant attention for smoother implementation. Staff recommended using existing relationships with event organizers and frequent vendors as a starting point for pilot initiation. Streamlining the application process could benefit a food scraps collection program as well as ensure documentation is collected from all organizers and vendors. Education and outreach through various touch points were identified as critical to program implementation success.

2. RECOMMENDATIONS FROM EVENTS STAFF

- **Engage vendors and organizers to improve food waste collection at events.** Events staff noted the importance of this engagement to ensure smoother implementation of food waste collection at events. Staff recommended using existing relationships with event organizers and frequent vendors to encourage program participation from other vendors. Events staff also recommended providing vendors with a list of compostable products and where products may be purchased to increase use of truly compostable products.
- **Provide an incentive or discount on refuse totes when food waste or recycling totes are requested.** Events staff made this recommendation as a way to increase food waste collection for a voluntary food waste collection program for events.

[31] "Food Donation and Food Scraps Recycling Law", NYS DEC, https://www.dec.ny.gov/chemical/114499.html. Accessed November 2020.

[32] "Ulster County Food Waste Prevention and Recovery Act", Ulster County, https://ulstercountyny.gov/environment/food-waste-prevention-and-recovery-act. Accessed November 2020.

- **Streamlining the events application process to benefit the food scraps collection program for events.** Events staff noted that streamlining the process would ensure that documentation is collected from all organizers and vendors and provide additional opportunities for education and outreach.
- **Centralizing the City's application review process.** At the time of this conversation, the decentralized nature of the City's application review process for events and recreation facility rentals was likely to add complexity to the critical educational component associated with the implementation of an organics collection program for events. Depending on the event size or past relationships, applications could have been reviewed and approved by the Parks & Rec Superintendent, Parks & Rec Clerk, Special Events Coordinator, who is also the Mayor's Confidential Secretary, or a recreation facility's caretaker. Additionally, it is likely that this decentralized structure potentially could have limited the effective implementation of a trash collection fee system. This system has been simplified as of the publication of this Study.
- **Pilot food scraps collection at City-hosted events and employ local high school students as waste ambassadors.** Events staff recommended piloting food scraps collection at one of the number of events hosted by the City as a high degree of control over the food scraps collection process would be possible. Events such as the 4th of July parade and the Italian Festival were mentioned. Events staff noted that many high schools have environmental clubs and all high schools require completion of community service hours.

3. EVENTS BACKGROUND

The City of Kingston hosts or supports dozens of events annually, whether at City-owned properties, City streets, or on private properties.[33] The City provides services for events it hosts or supports; services may include, for example, recycling and/or refuse collection, police presence, street closures, and public transit.

City-hosted events are coordinated and funded by the City. Examples of hosted events include Burning of Kingston, Forsyth Nature Center Fall Festival, and Fourth of July Celebration. City-supported events are hosted by private entities. Examples of City-supported events include Hudson Valley Hullabaloo, Kingston Farmer's Market, Kingston High School football games, Made in Kingston, March of Champions Drum and Bugle Corps, St. Patrick's Day Parade, and Sinterklaas. A subset of events also rent pavilions on the day(s) of the event, such as the March of Champions Drum and Bugle Corps and the Bon-Odori Dance Festival for Peace.

3.1. Events Management

As noted above, the events management description is from the time of this conversation, with the event application process now more streamlined. The application process practices within the City developed organically over time. Applications are submitted to the Special Events Coordinator or the Department of Parks & Recreation (Parks & Rec). Applications are received in paper and online formats as well as by phone. Applications can be emailed, mailed, or submitted in person. Duplicate intake points also exist in certain cases, such as with the March of Champions Drum and Bugle Corps.

[33] A complete listing of events selected for analysis for food waste production potential, whether hosted or supported by the City, are found in this Study in "Events Estimate". Projections and analysis are also included.

Applications are not collected for all events. For example, events held at Dietz Stadium typically only complete the portion of the Special Event Application Checklist applicable to their need, such as special requests for traffic cones or vendor applications. Events hosted by the Parks and Rec Department with no vendors, such as Kingston Clean Sweep, also do not complete a Special Event Application; in such cases the Parks and Rec Department takes responsibility for coordinating all aspects of an event.

The Special Events Coordinator handles most large events, those considered special events, or those it has historically handled. Examples include African American Festival, Burning of Kingston, Italian American Festival, Memorial Day Ceremony and Parade, Kingston Farmer's Market, and Kingston Multicultural Festival. The Coordinator processes the City of Kingston Special Event Application, which is used for some events held on City property/streets as well as by private organizers requesting City services for events being held on private properties.

The Parks & Recreation Department handles applications for rentals associated with municipal buildings, parks, and pavilions; some large events like O+; and other events it has historically handled. The Parks and Rec Department uses three different application formats:

- One for the Everette Hodge Community Center;
- Another for the Andy Murphy Neighborhood Center, Rondout Community Center, Hasbrouck Stone Building, Forsyth Nature Center Gazebo, and pavilions at the following parks: Rotary Park at Kingston Point, Loughran Park, and Kingston Point Beach; and
- The Active Network online application system, which is used for pavilions.

For use of City property events, rental fees are charged, typically ranging from $65 to $300 per location, with some fees higher during weekends/holidays and for non-residents. The rental fee for the Everette Hodge Community Center is a $25 refundable key deposit.[34]

3.2. Special Event Application

The Special Event Application is also used for permit requests for block parties and parades. Vendors associated with events on City property/streets also submit a vendor application to the Special Events Coordinator; this is not required of vendors for events held at private properties. These different requests are listed on the Special Event Application Checklist.

Private event organizers and vendors for events held on City property/streets are also required to provide proof of insurance meeting the City's insurance requirements. Events inadvertently bypassing the application process may not be providing the required insurance documentation.
The application fee for the Special Event Application or any sub-application (parade, block party, parking restriction, street closure) is $25; the vendor fee is $40.

Applicants are required to make provisions for both refuse and recycling receptacles for events where refuse is generated. Totes for refuse or recycling are available from the City for $20 per tote; no deposit is required.

[34] There is now a keypad for entry at Hodge Center.

Additional fees may be charged for personnel associated with police presence, DPW staff, and transportation. Parking fees are also charged for events requiring suspension of regulations for on-street and off-street parking, metered and non-metered. Street closure applications pay for the implementation of a detour plan depending on the size of the detour. These fees are listed on the Special Event Application Instructions page as well some of the other specific application sections.

With the exception of the requirement for refuse and recycling receptacle provision, the City's primary point of contact with vendors is for licensing, insurance, and health department status. The event organizer typically discusses how waste should be managed. For City hosted events, City staff or a planning committee can be the primary point of contact.

3.3. Waste Collection for Events and at Pavilions[35]

Pavilion waste and waste from events handled by the Parks & Recreation Department are handled by Parks & Recreation laborers. Refuse removal fees for pavilions is $120 and for maintenance staff at the Andy Murphy or Rondout Neighborhood Centers is an additional $60 per hour per staff person. Pavilion users can opt to carry-in/carry-out refuse and recycling for no fee, but are informed that the City may charge a minimum of $200 if they are found to be non-compliant. Parks staff estimate that only 15% of pavilion users opting to carry-in/carry-out are non-compliant. Enforcing the non-compliance fee has proven to be difficult.

For other events where waste collection is requested, DPW laborers provide waste collection and handle tote rentals. For special requests, the Special Events Coordinator places the Special Event Application in a shared events folder and alerts the appropriate staff/departments from the events list (Police, Fire, DPW, safety officer) to review the application. DPW and the safety officer review applications for upcoming events to determine tasks and sign-off on subsections of the Special Events Application form.

4. EVENTS STAFF INPUT

Various staff involved in events management discussed the challenges and opportunities for rolling out a food waste collection program at events. It was noted that people generally do not like seeing so much food being wasted. Staff input focused, in order of conversation, on large events, the Special Events Application, tote fees, other services, food waste collection at events and in recreation buildings, composting habits, and compostable serving ware. A synopsis of the input shared is listed below by topic area.

- Large Events: The Special Events Coordinator meets with organizers of large events. These meetings can serve as a point of information on any organics collection program that may be unveiled. Most large events recur annually.
- Special Events Application: The application can be easily modified to include the option for food waste collection at events.
- Tote Fees:

[35] Waste sorts of four events were conducted. Pavilions rental data was collected. The full data collected and analysis are found in Appendix B. Waste Assessments.

- Many long-time recurring events may not be amenable to paying a tote rental fee for collection of food waste. Some events have chosen to manage their own refuse collection rather than pay for the $20/tote rental fee.
- Fees for totes for collection of recyclables are waived.
- Recommendation: Provide an incentive or discount on refuse totes when food waste or recycling totes are requested.

- Other Services: Deposits for cones and other equipment is $20. The deposit is payable in advance, but not routinely charged.
- Food Waste Collection at Events:
  - The Fourth of July Celebration was recommended as a potential food waste collection pilot as it is City-hosted. Others noted that parades may be more difficult.
  - It was noted that the other events may be a more natural cultural fit and easier to pilot, such as the Made in Kingston event.
  - Other events, such as the Italian Festival, may make more sense because there are many food vendors.
  - The role of organizers and their engagement with vendors was discussed: organizers are responsible for ensuring vendors meet event requirements. Concern was expressed about vendors receiving the correct information from organizers on source separation as working with event organizers comes with challenges.
  - It was noted that effective source separation at events could be supported by high school students. Many high schools have environmental clubs and all require community service hours.
  - City-hosted events were viewed as an easier starting point for food waste collection.
  - A robust education component would be important for vendor engagement to ensure food waste is properly composted and the correct compostable serving ware is being used.
  - It was recommended that frequent vendors be engaged as early food waste collection participants to encourage program participation from other vendors.
  - It was recommended that the City engage with Radio Kingston to promote any food waste collection program at events. Targeting a pilot to those organizers with which the City has strong relationships would also be very beneficial to successful program implementation.
  - The use of tote liners will be important for residential food waste collection and may also help improve participation in events.
- Food Waste Collection in Recreation and Municipal Facilities:
  - Municipal Buildings: Food waste collection bin locations would need to be clearly identified and communicated to building staff as bins typically do not have set spots.
  - Recreation Facilities: The three-bin waste station was identified as an effective collection model. This model could be very effective for events held at Dietz Stadium.
- Composting Habits: It was noted that children would be more likely to engage in a food waste collection program than adults.
- Compostable Serving Ware: It was noted that many vendors are already using compostable serving ware. To increase program success, vendors should be provided with a list of compostable products and where products may be purchased.

A.5. CITY OF KINGSTON FIRE DEPARTMENT

Project Coordinator Noble and Carla Castillo met with former Fire Chief Mark Brown on March 16, 2020, for an initial conversation to explain the scope of project, present findings from waste sorts and facility walk-throughs of the three career fire stations, present preliminary recommendations, and obtain feedback.

1. OVERVIEW

The speed at which firefighters must respond to calls of a life-saving nature must be a key consideration in the implementation design of a compost collection program. Certain implementation design features that may be applicable to most municipal buildings may need to be adjusted to respond to the workflow of fire stations. The development of clear educational resources and policies will be critical to ensuring program participation and compliance.

2. RECOMMENDATIONS FROM FIRE DEPARTMENT STAFF

- **Continue firehouse waste reduction measures by replacing Keurig pods with reusable pods.** Firefighters noted that prior to purchase of Keurig machines, full coffee pots were frequently made for only one person. Keurig has reduced coffee waste, but use of disposable Keurig pods would hamper composting of coffee grounds.
- **Replace paper towel stations with high-efficiency electric hand dryers.** Different stations expressed differing preferences for hand drying prior to heading out on a call, an important consideration given that firefighters need to leave immediately for calls. Recent research on the environmental implications of GHG emissions emitted during the production of electric hand dryers versus paper towels using life cycle assessment finds that high-efficiency electric hand dryers emit less GHGs during their production cycle than paper towels.[36] The City should transition hand drying in all public spaces to high-efficiency electric hand dryers; high-speed electric hands-in dryers were found to be the most efficient. Certain locations, such as in kitchen areas, may not be conducive to electric hand-dryers. Additionally, a recent study found that drying hands with a jet dryer until completely dry "is the best method to eliminate bacteria on hands".[37]
- **Provide informational background on food spoilage timeframes.** At times, a firefighter may get four calls in a row while attempting to eat one meal. Food left out while firefighters are out

[36] A number of recent studies affirm this statement:

- Joseph T, Baah K, Jahanfar A, Dubey B., A comparative life cycle assessment of conventional hand dryer and roll paper towel as hand drying methods. Sci Total Environment, 2015, May 15;515-516:109-17. doi: 10.1016/j.scitotenv.2015.01.112. Epub 2015 Feb 18. PMID: 25704267. https://pubmed.ncbi.nlm.nih.gov/25704267/.
- Ingwersen, W., M. Gausman, A. Weisbrod, D. Sengupta, S. Lee, J. Bare, E. Zanoli, G. Bhander, and M. Ceja., Detailed Life Cycle Assessment of Bounty Paper Towel Operations in the United States, Journal of Cleaner Production. Elsevier Science Ltd, New York, NY, 131:509-522, (2016). https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&direntryid=331163.
- Gregory, Jeremy R., Trisha M. Montalbo, and Randolph E. Kirchain, "Analyzing uncertainty in a comparative life cycle assessment of hand drying systems", International Journal of Life Cycle Assessment 18:8 (2013), pp.1605-1617. https://dspace.mit.edu/handle/1721.1/103115.

[37] Suen LKP, Lung VYT, Boost MV, Au-Yeung CH, Siu GKH, Microbiological evaluation of different hand drying methods for removing bacteria from washed hands, Sci Rep., 2019 Sep 24;9(1):13754. doi: 10.1038/s41598-019-50239-4. PMID: 31551459; PMCID: PMC6760209, https://pubmed.ncbi.nlm.nih.gov/31551459/.

on a call is typically thrown away when firefighters return from the call. Providing information on the length of time it takes for food to become unsafe to eat can help reduce the amount of wasted food associated with meals.

- **Provide information on what foods can be composted and clear policies on food waste reduction measures.** Firefighters conveyed the importance of receiving this information to increase food waste collection program participation and implementation success.

3. FIRE DEPARTMENT BACKGROUND

The Fire Department workforce consists of 52 career personnel and 20 volunteers[38] who are overseen by the Fire Chief across seven fire stations. Three stations are career stations and four are volunteer stations. Kingston fire fighters respond to approximately 5,000 emergency incidents annually. The Fire Department also provides basic life support services. The Kingston Fire Department has a three-minute response time to any part of the City.

The three career fire stations were discussed as part of this stakeholder input meeting: Central Firehouse, Uptown Firehouse (also known as Frog Alley), and Rondout Fire Station. Forty firefighters cycle through the three stations over four 24-hour shifts. Central Firehouse, located at 19 East O'Reilly Street, has daily staffing of four firefighters; a total of 16 firefighters cycle through across the four 24-hour shifts. Uptown Firehouse, located at 62 Frog Alley, also has daily staffing of four firefighters; a total of 16 firefighters cycle through across the four 24-hour shifts. Rondout Fire Station, located at 5 Garraghan Drive, has daily staffing of two to three firefighters; a total of eight firefighters cycle through across the four 24-hour shifts.

4. FIRE DEPARTMENT INPUT

In addition to explaining the scope of the project, the Fire Chief was presented with findings from the waste sorts and facility walk-throughs at the three career fire stations as well as preliminary recommendations. These findings and the analysis are located in this Study in this Study's Appendices, Appendix B. Waste Assessments. Input focused, in order of conversation, on the Rondout Fire Station / Building Safety & Zoning Enforcement building, coffee makers, hand drying, food consumption practices, and compost program implementation. A synopsis of the input shared is listed below by topic area.

- Rondout Fire Station / Building Safety & Zoning Enforcement: A single building houses both the Fire Station and Building Safety & Zoning Enforcement. It was confirmed that at the time of the waste sort, March 22, 2019, the Fire Station and Building Safety shared external waste totes. As of this stakeholder input meeting, Building Safety now has its own waste totes. It was confirmed that the food waste weighed as part of the waste sort in 2019 included food scraps from Building Safety's small kitchen.
- Coffee Makers: All fire stations had at least one Keurig[39] in addition to one automatic drip coffee maker. Keurigs were introduced to reduce waste; prior to Keurig purchase, full coffee pots were frequently made for only one person. Generally, coffee grounds are produced throughout the day as most stations typically make full pots of coffee three times a day.

[38] "City of Kingston Fire Department, Department Information", City of Kingston, https://kingston-ny.gov/content/8399/8469/8481/8733/default.aspx. Accessed December 14, 2020.

[39] Some Keurig machines were purchased by individual staff.

- Drying Hands: Hand drying practices were discussed. All career fire stations use pull down paper towel dispensers. Fire stations have not yet been retrofitted to electric hand driers for two primary reasons: drying speed and cost of electric hand dryers. First, firefighters need to be able to dry their hands almost instantaneously so that they can leave for an emergency call immediately. Second, the quickest drying electric hand driers, such as Dyson, are expensive. The Fire Department is open to considering the installation of appropriate electric hand dryers. Timing for potential electric hand dryer installation may be linked to renovation of fire houses.
- Food Consumption Practices: Food consumption practices at the fire houses were discussed as a means of understanding food waste produced. For example, firefighters need to leave immediately for calls. At times, a firefighter may get four calls in a row while attempting to eat one meal. Food left out while firefighters are out on a call is typically thrown away when fire fighters return from the call. Providing information on the length of time it takes for food to become unsafe to eat can help reduce the amount of wasted food associated with meals.
- Compost Program Implementation: The Fire Department is committed to participating in a municipal food waste collection program. To increase participation and implementation success, the following were identified as helpful resources: information on what foods can be composted and clear policies on food waste reduction measures.

B. RESIDENTIAL & COMMERCIAL

B.1. BUSINESS ALLIANCE OF KINGSTON & KINGSTON UPTOWN BUSINESS ASSOCIATION

A public input meeting was held with the City of Kingston business community from the Business Alliance of Kingston (BAK[40]) and the Kingston Uptown Business Association (KUBA[41]) on February 19, 2020. The meeting focused on informing Kingston business community stakeholders of the Kingston Organics Diversion Project, presenting the findings from the Kingston small business survey[42], and obtaining feedback on the following topics: the need for educational content on reducing pre-consumer food waste, interest in food waste donation, participation in a potential organics diversion program, back-of-house and front-of-house collection, food waste storage practices, food waste collection frequency, and food waste collection preferences. Seventeen participants attended, including representatives from two restaurants, a hotel, a food waste composter, a cultural center, the media, the general business community, residents, a realty company, a county representative, and an elected official.

1. OVERVIEW

Participating stakeholders shared their concerns regarding the implementation of a composting program for businesses producing food waste. The concerns discussed – program implementation cost, space limitations, changing consumer habits, changing restaurant practices – were in line with concerns found in studies reviewed as part of this Study's literature review. Implementation of a commercial organics waste collection program will require substantial engagement and outreach to

[40] "Business Alliance of Kingston", Facebook, https://www.facebook.com/BusinessAllianceofKingston/. Accessed November 2020.

[41] "Kingston Uptown Business Association", https://kuba.network/; contact email, https://kuba.network/kingston-uptown-business-association/contact/; Facebook, https://www.facebook.com/KingstonUptownBusinessAssociation/. Accessed November 2020.

[42] The full results of the survey are presented in detail in Appendix A. Kingston Compost Survey.

customers and staff to ensure program success. Revisualizing space use will also be important to program success. The City can strengthen program design by applying known best practices from other local government programs for small business food waste collection. More extensive input from food waste producing businesses is detailed in the Kingston Compost Survey section.

2. RECOMMENDATIONS FROM BAK & KUBA PUBLIC INPUT MEETING

- **Consider conducting a customer survey to determine desire for large food portions.** To determine the viability of reducing portion sizes at restaurants, which would reduce food waste with end-consumers, the City should consider conducting a survey to learn if the Kingston community is open to restaurants reducing food portions.
- **Update restaurants on the State's and County's food donation regulations.** The public input session revealed that it would be beneficial to provide a simple informational guidance document that outlines food donation regulations. Outreach to restaurants at their establishments and/or through association meetings, as well as dissemination via media outlets will improve uptake of information.
- **Consider establishing a restaurant food waste diversion task force to manage the unveiling and outreach for a successful food scraps collection program.** To address concerns raised by attendees of the public input meeting, instituting a task force to discuss potential solutions to concerns would be beneficial for food diversion program success.
- **Consider collecting restaurant food waste twice weekly.** Food waste putrefaction during summer months is an important concern to be addressed as it can have a detrimental impact on a food waste collection program. The easiest approach is providing twice weekly food waste collection during summer months. Twice weekly collection may need to be the standard practice year-round if most restaurants are found to have insufficient food waste storage space.
- **Consider conducting an additional survey of restaurants to understand challenges associated with a food waste collection program.** Areas to explore in this additional survey should include food waste storage capacity and need for year-round twice weekly food waste collection. The survey can be conducted by a restaurant food waste diversion task force and inform the City of additional resources and policies to ensure programmatic success.

3. BAK & KUBA BACKGROUND

The Business Alliance of Kingston and Kingston Uptown Business Association are two of three business associations available to local businesses.[43] BAK and KUBA are both nonprofit entities.

3.1. Business Alliance of Kingston

The mission of BAK is to help the Kingston "community to prosper by supporting locally owned independent businesses through education, marketing, advocacy and citizen involvement." The BAK coalition includes business leaders from the Uptown, Midtown, and Rondout business districts. BAK offers business owners engagement opportunities through monthly meetings as well as creates the space for business leaders to dialogue with municipal officials. BAK hosts the annual Made in Kingston event. BAK's board consists of nine volunteer members.

[43] The Kingston Waterfront Business Association (KWBA) is a nonprofit organization of downtown businesses and property owners, representing and promoting the businesses in the Rondout community; https://www.thekingstonwaterfront.com/. Accessed November 16, 2020.

3.2. Kingston Uptown Business Association[44]

The mission of KUBA is to "provide leadership, foster trade and commerce and interface actively with the local government in efforts to promote Uptown Kingston." KUBA offers business owners networking opportunities throughout the year as well as monthly meetings. KUBA hosts the annual Snowflake Festival as well as the seasonal Shop Small in Kingston and Give a Gift from Kingston events in the Stockade District. As of November 2020, KUBA's board consists of 15 volunteer members. Ninety-eight businesses are KUBA members.

4. BAK & KUBA INPUT

The restaurants present agreed conceptually with the benefits of food waste collection for composting, but identified a number of hurdles that would need to be addressed before food waste collection could be seriously considered. Director[45] of the Ulster County Department of the Environment, Nick Hvozda, briefly presented the County's Food Waste Prevention and Recovery Act and responded to questions; Hvozda noted that the Act would be applicable to establishments producing two tons of food waste per week in 2020, and to establishments producing one ton weekly starting in 2021. Stakeholder input focused on, in order of conversation, reducing food portions served, the amount of food waste produced, challenges to collection of food waste, food waste collection practices, the Bokashi composting option, food donation challenges, compostable liners, the Ulster County Food Waste Prevention and Recovery Act, and an existing composting company. A synopsis of the input shared is listed below by topic area.

- Reducing Food Portions Served: Some restaurants would not feel comfortable reducing portion sizes as customers have come to expect large portions and typically take leftovers home for later consumption.
- Amount of Food Waste Produced: Restaurants present noted that the quantity of food waste produced at their restaurants is significant.
- Challenges to Collection of Food Waste:
    - Restaurants that use single-serve products, such as creamers and barbeque sauce, do not envision having the capacity for unused single-serve products to be emptied either by back-of-house or front-of-house staff. This would be particularly difficult for single-serve foods contained in plastic. One restaurant noted it uses 4,000 creamers per week; it could not envision complying with food waste collection requirements without hiring of additional staff.
        - It was recommended that single-serve products could be replaced with larger decanters, but a restaurant owner present noted that sealed containers are mandated by the Ulster County Department of Health.[46] A follow-up conversation with Cory Kassler of the Ulster County Department of Health confirmed that it is not required to donate foods in single-serve packaging. Mr. Kassler noted that hotels often are able to donate excess food in hotel pans as

[44] KUBA graciously hosted the BAK / KUBA stakeholder input meeting at the Best Western Plus Kingston Hotel and Conference Center.

[45] At the time of this public input meeting, Hvozda was serving as the deputy coordinator.

[46] The NYS DEC *Food Donation and Food Scraps Recycling Law – Guidance for New York State Businesses* (https://www.dec.ny.gov/docs/materials_minerals_pdf/excessfoodbusinesshandbook.pdf) indicates that individually sealed packaging may be required by organizations accepting prepared foods. The Ulster County Health District Sanitary Code does not (https://ulstercountyny.gov/sites/default/files/documents/health/UC%20Sanitary%20Code%2004.18.17.pdf).

long as the NY State and federal guidelines around temperature, etc., are followed.[47]

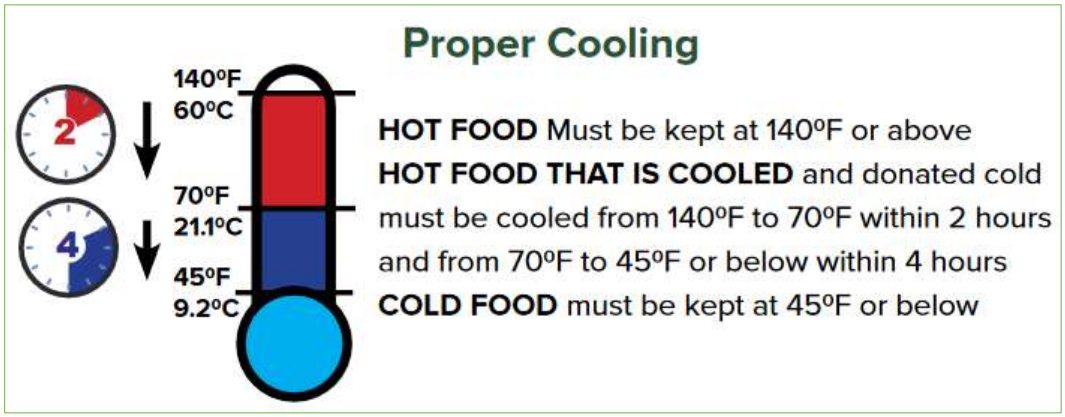
- Restaurants typically have significant space limitations that do not allow for additional collection receptacles back-of-house. For example, back-of-house areas can contain a dishwashing machine, an area where food waste is removed from plates, and two doors that allow for separate entry and exit into the kitchen areas. Another restaurant believed their back-of-house layout would allow for food waste collection.
- The stakeholder from a hotel noted that source-separating food from guests would be difficult to implement.

- Food Waste Collection Practices:
  - Restaurants present expressed concern regarding the prospective collection schedule for food waste bins. One restaurant noted that their twice weekly collection was due to physical capacity constraints as well as management of food waste odor.
  - Restaurants present noted that 20% of food waste is from back-of-house and 80% from front-of-house. A compost company in attendance that provides food waste collection services to area restaurants noted that in their experience the higher percentage of food waste comes from back-of-house.
  - A stakeholder from a local hotel shared that the hotel pays a private hauler to collect its waste twice weekly. The cost for this service is already significant. The hotel now uses compostable flatware.
  - A stakeholder asked if bones could be collected; commercial composting operations do accept bones.
- Bokashi Composting Option: A participating stakeholder noted that small restaurants can employ the Bokashi composting method, an anaerobic composting method that ferments all food waste using beneficial microorganisms like lactic acid bacteria, yeast, and phototropic bacteria.[48] This method requires storage of food waste in an airtight container with a spigot to drain off the liquid produced as the food waste ferments. The fermented product can be buried directly in the soil or added to a compost pile for finished composting. Additional information on the Bokashi composting method is found in this Study's Appendices, Appendix A. Kingston Compost Survey, "Current Residential Composting Practices".
- Food Donation Challenges:
  - A restaurant noted that its locale wastes a significant amount of soup, but indicated that regulations do not permit hot food to be donated. Another restaurant noted regulation issues with maintaining temperature for donated food. Individually packaged food donations are easier to handle.

[47] Corey Kassler, Senior Public Health Sanitarian, Ulster County Department of Health, telephone conversation, November 15, 2022.

[48] Bokashi is an anaerobic composting method that ferments all food waste using beneficial microorganisms like lactic acid bacteria, yeast, and phototropic bacteria. This article provides a good overview of this method: "Bokashi – A Compact Solution to Food Waste in Small Restaurants", Modern Restaurant Management, https://modernrestaurantmanagement.com/"-a-compact-solution-to-food-waste-in-small-restaurants/. Accessed November 16, 2020.

- The NYS DEC *Food Donation and Food Scraps Recycling Law – Guidance for New York State Businesses*[49] confirms that prepared foods can be donated and provides guidelines for donating them, as shown below.



  - Collecting of food waste for donation for animal feed was also seen as challenging for both back- and front-of-house layouts.
- Compostable Liners: A meeting attendee recommended that compostable liners not be used as many brands may not decompose within the composting timeframe. Also, some compostable liners are made with ingredients that are considered to be potentially harmful to humans.
- Food Waste Prevention and Recovery Act: A few stakeholders expressed concern about the application of the law to their establishment.
- Composting Company: A representative from Greenway Environmental Services expressed an interest in taking the City's food waste.[50]

B.2. KINGSTON COMPOST SURVEY

1. SURVEY DEVELOPMENT

1.1. Survey Intent

The Kingston Compost Survey was developed to gain an understanding of self-reported current composting practices and interest in participation in a source separated organics collection program. The survey was open to responses from May 15, 2019, through February 27, 2020. A total of 323 responses were received. Of these responses, 19 were removed from the analysis as the respondents neither lived in Kingston nor worked at or owned a Kingston business. Four were removed from the analysis due to largely incomplete surveys, resulting in 300 responses analyzed. The survey was designed to capture information from residents as well as small commercial businesses, including food businesses, operating in the City. Survey respondents were introduced to the Kingston Organics Diversion Study project with the below statement included at the beginning of the survey. The survey is included in City of Kingston Organics Diversion Study – Appendices.

> Thank you in advance for completing this survey on food scraps collection, also known as composting or organics recycling. The City of Kingston is exploring removing food scraps and food waste from the waste stream to keep municipal costs down and to provide a beneficial

[49] "Food Donation and Food Scraps Recycling Law – Guidance for New York State Businesses", NYS DEC, https://www.dec.ny.gov/docs/materials_minerals_pdf/excessfoodbusinesshandbook.pdf, 2022. The screenshot is taken from p.12.

[50] Greenway Environmental Services' operation is described in depth this Study in "Food Waste Processing", "Composting Facility Site Visits".

service to the City's residents and small businesses. The City is working with you to reduce the amount of waste that is sent to landfills. We already do this by recycling and collecting yard waste. Together we can make an even bigger impact by removing food scraps and food waste from the waste stream. This survey will help the City understand the type of programs that will best suit Kingston residents and small businesses. Thank you, again, for taking this 5-minute survey! Please feel free to reach out to climatesmart@kingston-ny.gov with any questions regarding this survey. Please return completed surveys by June 15th to Sustainability Coordinator Julie Noble at 467 Broadway, Kingston, NY 12401 or scan and email to climatesmart@kingston-ny.gov.

1.2. Survey Design

The survey was designed as a single survey to obtain responses from three respondent types: residents, residents who owned or worked at a small commercial business located in the City, and non-resident owners of or workers at small commercial businesses located in the City. Compost was used to refer to food waste and instead of food waste diversion as compost is commonly understood to refer to food scraps that will be composted. Decision trees were used to direct survey respondents through the sections of the survey applicable to them. A synopsis of survey results is included in section "Analysis of Survey Results". The complete analysis of the survey results is found in this Study's Appendices, Appendix A. Kingston Compost Survey.

The single survey design was determined the best instrument option to obtain the most responses from the sometimes overlapping subsets of respondents the City was interested in understanding. As is noted in the section "Analysis of Survey Results", many respondents were residents who owned or worked at a small commercial business in the City.

The survey was developed by HVRC with input from City Mayor Steve Noble and City staff, including Sustainability Coordinator Julie Noble, former Environmental Specialist Sean Koester, Communications & Community Engagement Director Summer Smith, and former Climate Smart Kingston Commissioner Maija Niemisto.

1.3. Survey Implementation

The survey was open to responses from May 15, 2019, through February 27, 2020. A total of 323 responses were received. Of these responses, 19 were removed from the analysis as the respondents neither lived in Kingston nor worked at nor owned a Kingston business. Four were removed from the analysis due to largely incomplete surveys. Of the remaining 300 respondents, 56 owned or worked at businesses in the City.

The survey was made available to respondents primarily through SurveyMonkey, an online survey tool. The article "Kingston solicits public input on composting" in *The Daily Freeman* announced the launch of the survey on May 28, 2019, and provided background on the Kingston Organics Diversion Project. The survey was also promoted by the City on its official municipal Facebook page and by the late John Wackman, a Climate Smart Kingston Commissioner, on the Climate Smart Kingston Facebook page.

To increase the number of small commercial business respondents, food businesses, such as restaurants and coffee shops, were directly contacted to encourage their participation. Interns from

Cornwall Central High School, Alexandra Raposo and Claudine Franco, placed calls to businesses to encourage their completion of the survey. Some businesses completed the survey by phone with the interns, while other businesses completed the survey online. Food businesses were contacted in person to encourage completion of the online survey or were supported in completing the survey in person by Sustainability Coordinator Julie Noble, Climate Smart Kingston Commissioners Brenna Robinson and Maija Niemisto, KCAC member Lorraine Farina, and former Environmental Specialist Sean Koester. Both interns and Kingston staff and affiliates used a pre-prepared script to guide their communications with the food businesses. The responses from surveys completed by phone or in person were inputted into the SurveyMonkey survey instrument by Communications & Community Engagement Director Summer Smith. Small businesses attending a stakeholder input meeting[51] of BAK and KUBA were also encouraged to participate in the survey. The raw data from the survey was downloaded from SurveyMonkey by Communications & Community Engagement Director Summer Smith.

2. RECOMMENDATIONS FROM THE KINGSTON COMPOST SURVEY

2.1. Residential Composting Recommendations

- **Inform residents of home composting options.** While the survey revealed that the most commonly used composting method among respondents is backyard composting, providing residents with an informational flyer on the various home composting options will increase home composting participation and reduce the per ton cost for disposal of food waste at a local composting facility. Appropriate composting technologies are provided in this Study in "Composting Technologies". The flyer should include information on the backyard composters available through UCRRA as well as the private collection services offered by companies, such as CCC, and methods to reduce larger pest incursions into composting bins.
- **Inform residents of food waste containment practices as part of a curbside collection program roll-out.** Residents who indicated they did not compost nor divert their food waste noted odor and the unpleasantness of handling food waste as concerns. The City should create an informational guide that provides information on the variety of kitchen food waste collectors, refrigerator or freezer storing practices, and variety of bin liners that can help address concerns. This Study provides a comprehensive set of options in "Composting Product Options". Any informational documents should clarify that the decomposition rate of food waste in landfills is quite slow.
- **The City should conduct a bin right-sizing analysis in advance of rolling out a curbside residential food waste collection program.** Residents were very concerned about received another large bin for collecting food waste. The City should consider the existing range of bins that have been made available to residents for refuse, recycling, and yard waste to identify opportunities for right-sizing bins with a food waste collection roll-out. The bin size practices of other municipalities that have instituted residential curbside food waste collection programs should be consulted in this assessment, referencing Table 58. Municipal Case Studies – Curbside Bin Size in "Collection Synopsis" in this Study.
- **Consider purchasing backyard composters to distribute at minimal or no cost to residents.** The 2010-2012 Kingston Alcoa-funded study revealed that free backyard composters were

[51] Stakeholder input from the meeting with the Business Alliance of Kingston and the Kingston Uptown Business Association is discussed in the earlier section, Business Alliance of Kingston & Kingston Uptown Business Association.

integral to engaging participants as well as incentivizing participation. The study required reporting on household food waste production, with the penalty of composter removal for lack of participation; at large scale distribution, coordinating reporting is unlikely. A strong education and outreach component prior to distribution would increase bin use.

2.2. Food Business Recommendations

- **Consider collecting restaurant food waste twice weekly.** See recommendation in "Recommendations from BAK & KUBA Public Input Meeting". The survey confirmed that twice weekly collection was common amongst food business respondents. The City could incorporate this inquiry as part of the additional survey of restaurants.
- **Consider establishing a fee-based food waste collection program for food businesses.** Food business survey respondents indicated an openness to participating in a fee-based program. The City could incorporate this inquiry as part of the additional survey of restaurants. See recommendation in "Recommendations from BAK & KUBA Public Input Meeting".
- **Provide pre-consumer food waste reduction education.** Survey responses from food businesses demonstrated an interest in this education component. Since pre-consumer food waste is a significant portion of food business food waste, providing this educational offering and guidance documents would be beneficial to overall food waste reduction.

3. ANALYSIS OF SURVEY RESULTS

3.1. Background

A synopsis of survey results is included in this section. The complete analysis of survey results is found in this Study's Appendices. The synopsis provides an overview of findings from residents and business owners or workers, the responses from residents irrespective of business ownership or employment status, responses from small commercial businesses, and responses from food businesses.

3.2. Overview of Findings

City of Kingston residents and businesses are known for their high level of engagement in public planning processes. Their response to the Kingston Compost Survey was no different, representing the second highest responses of any recent Kingston survey at the time of its posting. The support for a curbside food waste collection program was positive across all respondent types.

3.2.1. Resident Responses

Survey: The majority of survey respondents were residents of Kingston who lived in single-family homes, with respondents most frequently living in two-person households. Respondents were fairly evenly distributed across the City's nine wards. Half of respondents already practiced food waste diversion while the other half did not. The majority of residents estimated that food waste represented about one-third of their refuse. As can be expected from the City's forward thinking sustainability efforts, this survey, focused on food waste diversion, drew a high response rate from respondents already practicing food waste diversion.

The majority of respondents who indicated they diverted food scraps did so onsite somewhere on their property outside of their home, with most using a single bin system that was in direct contact with the soil; most of these respondents had been doing so from one to five years. Very few indicated using a kitchen garbage disposal as a diversion method. While garbage disposals are a viable food waste

diversion method, traditional backyard composting methods remain the dominant method used in communities without curbside food waste collection. Respondents demonstrated a deep commitment to backyard composting by diverting their food waste year-round.

Residents who indicated they did not compost nor divert their food waste noted reasons typically seen: lack of knowledge, backyard space limitations, concern about neighbors, odor, pests, composting bin cost, the time commitment required, the unpleasantness of handling food waste, and the inability to use all compost produced. These responses reveal that a curbside program would address most concerns. While kitchen garbage disposals would address the unpleasantness of handling food waste, purchase and installation costs may prove prohibitive to many households. An education component promoting separate containment practices for food waste from other waste would help engage those concerned with the unpleasantness of handling food waste. Such an education component would be important to successful implementation of a curbside food waste collection program as more respondents indicated a preference for a municipal curbside collection program.

Facebook Comments: A separate analysis of public input from Kingston residents provided through Facebook revealed a slight majority being interested in a curbside food waste collection program. Of the 15 types of comments received, comments in the double percentage points focused on the Kingston Organics Diversion Study as a whole, composting practices, compost program cost, bins, and pests. Highlights on these comment categories are presented below.

- Program: Comments regarding a curbside food waste collection program were largely positive. Positive comments included statements like, “If a city as large as San Francisco can do it, we can too!” to general expressions of favorability. Negative comments included expressions of concern about the proper collection of food scraps through municipal waste services to the belief that food “will compost at the landfill.” The latter comment reflects an opportunity for education on the actual decomposition rate of food in landfills.
- Composting Practices: Comments related to composting practices were largely positive. Positive comments included sharing of personal, positive experiences with backyard composting to the type of composting program that would be of interest, with most interested in municipal collection but not drop-off locations. The sole negative comment focused on the concern that residents would be required to compost food waste in their backyards.
- Cost: Comments related to cost were slightly more positive than negative. Positive comments included statements like “Give taxpayers a compost barrel so they can turn waste in to useful dirt for our flowers and gardens.” One comment from a person in support of a curbside program was not in support of a Pay-As-You-Throw (PAYT) program and another hoped that the City could unroll a food scraps collection program in a “revenue neutral way”.
- Bins: Comments related to bins were largely negative. Positive comments focused on the size of the compost bin, with preferences higher for smaller totes or 5-gallon buckets. Negative comments focused entirely on the rejection of residents receiving any more large totes, such as "Can we please please please have yet ANOTHER 96 gallon tote for composting?" and bins "…are grossly over-sized for my household."
- Pests: Comments related to Pests were equally divided between positive and negative. Positive comments included having no issues with pests or noting how pest issues would be

addressed (e.g., securely closing compost bin lid). Negative comments focused on concerns about similar pests mentioned by survey respondents (groundhogs, skunks, raccoons, etc.).

Kingston 2010 – 2012 Study: The City of Kingston was funded by an Alcoa Foundation grant on a two-year study, 2010 – 2012, titled Waste Reduction Composting Program. Study participants were divided evenly between Kingston residents and residents living slightly outside the City boundaries. The study confirmed a number of findings found in other studies: a) waste production was in line with State studies at 4.5 pounds per household and 1.7 pounds per person per day; b) among those choosing to participate in the study, a commitment to project participation was evident by the 86.84% participation rate; c) the range of food waste composted during the study period was an indication of the participation that could be expected in an active diversion program – household diverted food waste ranging from 15 pounds to 333 pounds; d) the development of clear program materials and an education and outreach component were important to study participation; and e) a free backyard composter was integral to engaging participants as well as incentivizing participation with the penalty of composter removal for lack of participation.

3.2.2. Small Commercial Business Responses

A total of 56 respondents representing small commercial businesses completed the survey, with respondents equally divided between non-food and food businesses. The majority of food business respondents were not Kingston residents and were from the restaurant sector. Food business refuse collection frequency ranged from weekly to twice daily, compared to weekly for non-food businesses. The majority of small business respondents received refuse and recycling collection from the City. Small commercial businesses with private hauler collection for refuse received services from County Waste, Marangi Waste, Royal Carting, and Waste Management. Most businesses, whether food or non-food, stored waste outdoors.

Overall, both food and non-food businesses indicated an interest in participating in a municipal curbside food scraps collection program. Non-food businesses preferred to participate in a no-fee program, while food businesses were just as willing to participate in a fee-based program as they were a no-cost program.

3.2.3. Food Business Responses

Food business findings were developed from 26 respondents. Respondents represented Wards 2, 4, 5, 8, and 9, with most businesses, like limited-service restaurants, having one to five employees. Full-service restaurants had the greatest diversity in employee size. The majority of food businesses reported 51 to 500 weekly customers, with limited-service restaurants most frequently reporting this weekly customer range. Full-services restaurants also reported weekly customers in the 501 to 1,000 and 1,001 or more ranges. When asked to rank their preferred food waste diversion method, most food businesses cited “I would prefer that the City collect our business’ food scraps” as their top choice and “We are not interested in composting” as their least preferred choice.

Refuse: Food businesses provided information on waste disposal practices. Most used 35-gallon cans or totes and most reported putting their refuse out in 35-gallon bags. Both full- and limited-service restaurants reported the highest percentage of refuse disposed of in bags, with most in 35-gallon bags. Reported bag use, however, ranged from 13-gallon bags to 95-gallon bags, potentially indicating a

need for flexibility in bag sizing. When analyzed at the employee and weekly customer levels, 35-gallon bags were used across almost all employee categories and most weekly customer categories. The 35-gallon bag was clearly the bag that offered the most flexibility for all food business types. Full-service restaurants generally produced the largest number of weekly refuse bags, followed by limited-service restaurants, with the largest number of customers resulting in more refuse. Weekly containers of refuse were positively correlated with larger numbers of weekly customers.

Recyclables: Three quarters of food businesses used 50-gallon sized cans or totes, although respondents noted eight different sizes ranging from 32-gallon to 95-gallon.[52] Food businesses reporting "1 to 5" employees also reported the greatest variety in can/tote size used. Food businesses reporting "51 to 500" weekly customers reported the greatest variety in can/tote sizes used. Food businesses produced the largest number of weekly containers using 95-gallon containers, comprised mostly of bagged recyclables. The largest number of recycling containers were produced by full-service restaurants, followed by limited-services restaurants.

Food Waste: Half of food businesses estimated that food waste comprised more than half of their refuse, with a quarter of full-service restaurants reporting food waste comprising two-thirds of their refuse. A larger proportion of limited-service restaurants reported food waste comprising about half of their refuse. There was no readily identifiable correlation between food waste produced and persons employed nor weekly customers. Almost two-thirds of food businesses indicated that they had sufficient space for a can/tote devoted to food waste collection.

Pre-Consumer Food Waste Reduction Education: Just over half of the respondents expressed an interest in pre-consumer food waste reduction education, while half were interested in participating in a food donation program to food pantries or for animal feed, with almost a quarter already practicing food donation. Half indicated they already diverted their food waste.

Food Businesses that Already Diverted Their Food Waste: Of these businesses, half paid for these services through CCC; no food businesses used an onsite composting system. Half of those that employed other food diversion methods made the effort to take food waste to their home for composting, demonstrating a strong commitment to removing a useful resource from the waste stream. Two-thirds of food businesses used indoor food scraps collection bins. Half reported not using any bin liners, while one-third used liners for outdoor food scraps bins and just over one-eighth used liners for indoor collection bins. Close to three-quarters of food businesses reported having practiced food diversion from one to ten years, demonstrating a commitment to the practice, with two-thirds diverting their food waste even during the winter months.

Food Businesses that Did Not Divert Food Waste: Of these businesses, over three-quarters shared reasons that could be remedied with a well-designed food waste collection program that incorporated a strong education component; just under one-quarter were not interested due to space or vermin concerns. Close to three-quarters also indicated an openness to participating in a City-provided curbside food scraps collection program, with the majority interested in a no-fee program. The overwhelming majority of those food businesses that expressed an interest in diverting food waste

[52] The City's Code allows for nine bins to be put curbside, but none can exceed 32 gallons.

expressed a preference for storing food waste in a can or tote instead of a bag, and to using a liner as they indicated not being able to readily clean used cans/totes.

Restaurant Respondents: These respondents served more lunch meals than breakfast or dinner. More limited-service restaurants served breakfast; more full-service restaurants served dinner.

C. COMPOSTERS

C.1. RECOMMENDATIONS FROM COMPOSTERS

- **Reference education models implemented by Community Compost Company, Royal Carting, and the Village of Scarsdale in developing the City's education model to ensure that contamination rates are low for curbside food waste collection.** UCRRA noted the importance of a low contamination rate for maintenance of their certification standard with the US Composting Council and the connection to a strong education model. Whether curbside collection is managed by City DPW and Parks & Rec staff or contracted out to a hauler, a strong educational component is critical to programmatic success. CCC noted that any food waste collection program will only be successful with a comprehensive education component.
- **Institute three-bin waste station at events in combination with waste station volunteers.** Research shows that the three-bin waste station is the most effective collection method for on-site waste separation, with separate bins for waste, compostables, and recycling. A separate container for liquids is highly recommended for events that are expected to have a high liquid content. Five-gallon buckets with an opening for liquids is a good option, given that they are easily transportable once full.[53] In UCRRA's experience, the low contamination rates from large festivals like the Clearwater Festival are directly linked to the posting of waste station volunteers at three-bin waste stations. Other best practices UCRRA attributes to a low contamination rate from this large festival are iconographic information sheets affixed to each waste bin, indicating what goes into each bin, including the requirement that vendors use compostable or recyclable service ware.
- **Locate residential food waste drop-off locations that are more regularly frequented.** UCRRA has found that drop-off locations at community gardens or in local neighborhoods have greater participation rates than at transfer stations.
- **Consider instituting a residential locked drop site models to reduce contamination.** CCC recommended locked drop-sites to ensure minimal contamination, but noted that a strong education component is also necessary to reduce contamination, which is typically lower with curbside collection. Whether a locked drop site model or traditional drop-off site model is used, locations should have an assigned advocate who manages the food scraps collection bins and provides education.
- **Bypass differing composting facility requirements on the use of bin liners by promoting the use of paper bags.** Composting facilities have differing requirements around the use of bin liners based on the certification they are trying to meet. UCRRA's US Composting Council certification allows for UCRRA's acceptance of BPI certified compostable products. CCC's product is approved for organic use by the Northeast Organic Farming Association of NY (NOFA-

[53] Athena Lee Bradley, "Guidance for Special Event Food Waste Diversion", Northeast Recycling Council, Inc., 2010, https://nerc.org/documents/guidance_for_special_event_food_waste_diversion.pdf.

NY)[54]; they do not accept compostable bags or other compostable products such as cups, flatware, etc. because NOFA-NY does not allow any of these materials to be included in the stream.

- **Incorporate food waste reduction measures into residential educational materials.** CCC found that formerly skeptical participants improved their source separation practices and reduced food waste through practices like planning meals and food shopping with a list, which also led to savings in grocery bills.
- **Identify responsible municipal parties for contamination checks and removal of contaminants in a curbside food waste collection program.** Managing the cost of curbside collection and managing contamination are important to programmatic success. CCC highlighted the importance of a thorough and ongoing educational component for municipal sanitation laborers as a means of ensuring that contamination is kept to an allowable minimum.
- **Collaborate with existing partners to support the City's food scraps collection educational efforts.** CCC recommends partnering with UCRRA educators in supporting the educational efforts of a Kingston food scraps collection program.

C.2. ULSTER COUNTY RESOURCE RECOVERY AGENCY

Project Coordinator Noble met with former UCRRA former Executive Director Tim Rose and Director of Operations Charlie Whittaker on November 30, 2018. The meeting focused on explaining the scope of the project and the possibility of processing the City's food waste at UCRRA's facility.

1. OVERVIEW

UCRRA runs a nationally recognized[55] composting facility that accepts food waste from large-scale generators, commercial and residential haulers, some municipalities, and some Westchester County-based schools. UCRRA employed O_2Compost in the design of its Extended Aerated Static Pile (EASP) System. Finished compost produced by UCRRA is high quality and certified by the US Composting Council Seal of Testing Assurance (STA). The projected expansion of UCRRA's EASP composting facility will allow for increased acceptance of food waste from large-scale generators, UCRRA's primary food-waste source going forward. At the time of this conversation, UCRRA's expectation for high contamination rates from municipality-managed curbside programs prevented the City from considering UCRRA as an available composting facility for its food waste. More recently, under different leadership, UCRRA has indicated its interest in working with Kingston on an organics diversion program and in accepting the City's food waste. In August of 2022, the UCRRA received a permit modification that effectively increased the allowable annual tonnage from 2,500 tons to 5,000 tons per year of source separated organics, of which in March 2023, they estimate an available capacity of less than 1,000 tons. Additionally, contamination risk was, and still is, assessed to likely be very high from any residential sources.

[54] "About Organic Certification", NOFA-NY, https://nofany.org/certification/about/. Accessed November 2020.

[55] UCRRA was named Small-Scale Compost Manufacturer of the Year in 2021 by the US Composting council. UCRRA website post, National Compost Manufacturer of the Year Award, https://ucrra.org/national-compost-manufacturer-of-the-year-award/. Accessed October 2022.

2. UCRRA BACKGROUND

UCRRA is a solid waste authority, public benefit corporation, and permitted solid waste facility that operates independent of Ulster County. UCRRA has two transfer stations, one in Kingston and a second in New Paltz at 1 Clearwater Road. Per Ulster County Solid Waste Management Law, Local Law Number 10 of 2012,[56] all MSW generated in the County, including curbside collection, must go to an UCRRA transfer station. Under Ulster County Mandatory Source Separation and Recycling Law, Local Law Number 4 of 2010,[57] UCRRA also manages and processes recyclable materials. UCRRA's Recycling Outreach Team participates in events and offers classes designed to inform its constituents about recycling and waste reduction.

UCRRA is an NYS DEC permitted composting facility under 6 CRR-NY 361-3.2 Composting Facilities[58] that operates an EASP System. UCRRA developed its EASP system with guidance from O_2Compost,[59] a well-regarded company that provides custom compost system design and operator training. It is permitted to accept 5,000 tons of source-separate organic waste (SSOW), or greater than 2,500 wet tons per year. UCRRA is also permitted to accept greater than 10,000 cubic yards of yard trimmings per year, much of which is used for its composting operation.

UCRRA accepts SSOW from commercial food scraps generators as part of its Partners in Compost program; the program was unveiled in 2020. Generators include "haulers, commercial businesses, schools, restaurants/cafes, grocery stores, hotels, office buildings, farmers markets, municipalities, municipal recycling drop-off centers, nonprofit organizations, events/festivals, event venues, and other large generators".[60] UCRRA provides technical consultation and educational services to ensure low contamination rates. No residential food waste drop off is permitted due to the traffic pattern and safety provisions enforced in their NYS DEC facility operating permit. Most municipalities are limited from participating in the Partners in Compost program due to UCRRA's low contamination rate and STA certification requirements from the US Composting Council. Exceptions include municipalities like the Village of Scarsdale in Westchester County that began food scraps collection through a volunteer-driven drop-off program. UCRRA provides a comprehensive list of commercial and residential haulers serving Ulster County on its Food Waste Haulers webpage[61] as well as comprehensive Contacts List for

[56] "Local Law Number 10 of 2012", Ulster County, https://ulstercountyny.gov/sites/default/files/enviroment_council/2012%20-%20Local%20Law%20No.%2010%20of%202012.pdf. Accessed November 2020.

[57] " Local Law Number 4 of 2010", Ulster County, https://ucrra.org/wp-content/uploads/2020/03/Mandatory-Recycling-Law-LL-No.-4-of-2010.pdf. Accessed November 2020.

[58] "6 CRR-NY, Subpart 361-3. Composting and Other Organics Recycling Facilities, 361-3.2 Composting Facilities", https://govt.westlaw.com/nycrr/Document/Id4d62f22dfe911e7aa6b9b71698a280b?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default). Accessed November 2020.

[59] "O2 Compost", https://www.o2compost.com/. Accessed March 2023.

[60] "Compost Food at UCRRA", UCRRA, September 25, 2020. https://ucrra.org/waste-recycling/food-waste/compost-food-ucrra/.

[61] "Food Waste Haulers", UCRRA, https://ucrra.org/waste-recycling/food-waste/haulers/. Accessed October 2022.

Food Waste Management Services[62]. UCRRA also developed a Waste Reduction and Recycling Guide for Businesses, Schools, and Institutions[63] in 2022.

UCRRA's finished compost, marketed as Grow Ulster Green Compost, is currently sold at $30 per ton, or a minimum of $20 per load. The disposal fee for food waste is $20/ton and for yard waste is $40/ton.[64] UCRRA's compost is sampled and tested once per quarter by the US Composting Council's STA Certified Composting Program and is STA certified.[65] Compost receiving this certification meets specified requirements for pH, soluble salts, nutrient content, moisture content, pathogen presence, and trace metals presence, among other properties analyzed.[66] Finished compost is available for sale in bulk quantities, and is sold to landscapers, farmers, gardeners, and the general public in accordance with their Compost Sales Policy.

3. UCRRA INPUT

UCRRA staff input focused, in order of conversation, on the expansion of its composting facility, compost processing notes, hauling, SSOW accepted, other composting operations, events, and drop-off programs. A synopsis of the input shared is listed below by topic area.

- Expansion: At the time of these conversations, UCRRA's composting operation was at capacity. The Board approved the purchase of 52 acres adjacent to the existing facility, which UCRRA plans to use for the expansion of its composting operation, pending DEC approval. UCRRA is considering establishing a regional residential drop-off center at the entry to the new location and restricting the original site for deliveries from large generators.
- Compost Processing:
    - UCRRA partnered with UCDOE for the purchase of a bagging machine for finished compost; bagging would allow UCRRA to sell its finished product to companies like Home Depot and Lowe's. Fifty percent of the bagger's cost was funded by the Municipal Waste Reduction and Recycling Program[67] (MWRR) from NYS DEC, which provides reimbursement for 50% of eligible costs for capital investment in facilities and equipment.[68]
    - Odor complaints from the original operation are infrequent, depending on the prevailing winds.
    - Brush and wood are collected and ground for use in the EASP. Leaves are not used because they clog the grinder.
    - UCRRA uses a 3/8^{ths} of an inch Trommel screen.
    - The EASP is functioning well and is inexpensive when compared to other systems.

[62] "Ulster County Master Contacts List for Food Waste Management Services", UCRRA, https://ucrra.nsddev.net/wp-content/uploads/2022/09/Master-Contacts-List-FOOD-WASTE-2022-9.13.22.pdf. Accessed October 2022.

[63] "Waste Reduction and Recycling Guide for Businesses, Schools, and Institutions", UCRRA, https://ucrra.org/wp-content/uploads/2020/11/UCRRA-Business-Waste-Reduction-Recycling-Guidebook-2020.pdf. Accessed October 2022.

[64] "Fee Schedule", UCRRA, https://ucrra.org/about-us/fee-schedule/ Accessed October 2020.

[65] "Compost for Sale", UCRRA, https://ucrra.org/compost-for-sale/. Accessed September 2020.

[66] "Seal of Testing Assurance (STA)", US Composting Council, https://www.compostingcouncil.org/page/CompostManufacturersSTA. Accessed September 2020.

[67] "New York State Grants Gateway", https://grantsgateway.ny.gov/IntelliGrants_NYSGG/module/nysgg/goportal.aspx?NavItem1=3. Accessed September 2020.

[68] According to the Program Guidelines, "If any Federal or other assistance is received for the project, reimbursement will be limited to 50% of the net eligible costs incurred after deduction of any Federal or other assistance received."

- Roadkill is composted separately from food waste, with the finished product used for onsite landscaping. The pile heats to 140˚ to 150˚ Fahrenheit, killing all pathogens, with bones decomposed within two weeks.

- Hauling: UCRRA does not anticipate offering hauling as an additional service. Doing so would put it in direct competition with existing private haulers. (Some of the curbside haulers listed in UCRRA's Find a Curbside Hauler webpage offer curbside collection, such as Royal Carting and Welsh Sanitation.[69])
- SSOW Accepted:
  - Curbside collected food waste typically has a high contamination rate. Large commercial generators produce cleaner SSOW. An UCRRA staff person inspects SSOW loads for contamination. UCRRA does not see plastic contamination from these generators. A low contamination rate is critical to UCRRA's ability to maintain its US Composting Council STA Certification. Depackaging machines are facilitating processing of food waste from large generators, like supermarkets.
  - UCRRA accepts commercial and residential SSOW from various haulers. Haulers educate participants on composting practices, resulting in very low contamination rates.
  - An education and information component resulted in very low contamination from the Village of Scarsdale's drop-off food scraps program, which delivers its food scraps to UCRRA. UCRRA also accepts food scraps from Scarsdale's curbside collection program, which was instituted after the Village's success with its drop-off program.
  - UCRRA has accepted food waste from events, working with companies such as CCC and the former residential and events composting company, Zero To Go. CCC is the only hauler that collects residentially generated food waste. UCRRA accepts BPI certified compostable serviceware products[70] from events. Use of BPI certified compostable products eliminates the inclusion of standard paper cups that are now typically coated with plastic and PFOA[71] containing products.
  - The second highest contamination rates are typically seen with schools. UCRRA currently accepts food waste from Westchester County schools that participate in We Future Cycle's[72] recycling program. We Future Cycle is a nonprofit organization that has helped 18 schools divert 90 – 95% of its waste stream through recycling and composting. Participating schools have a low diversion rate due to a robust education component delivered by We Future Cycle.
- Other Composting Operations: UCRRA noted two innovative organic waste recycling operations at Oneida-Herkimer Solid Waste Authority[73] (Authority) and Rockland County Solid Waste

[69] "Find a Curbside Hauler", UCRRA, https://ucrra.org/waste-recycling/find-a-curbside-hauler/. Accessed September 2020.

[70] "Search for Certified Compostable Products," Biodegradable Products Institute (BPI), https://products.bpiworld.org/. Accessed September 2020.

[71] PFOA or perfluorooctanoic acid is used as an industrial surfactant. According to the American Cancer Society's webpage on Perfluorooctanoic Acid (PFOA), Teflon, and Related Chemicals, is found in materials treated to be stain resistant or non-stick. Some studies have found an increase in certain cancers with higher presences of PFOAs and other related man-made chemicals.

[72] "we future cycle", https://wefuturecycle.com/. Accessed September 2020.

[73] "Food2Energy", Oneida-Herkimer Solid Waste Authority, https://www.ohswa.org/recycle/our-facilities/food-2-energy/. Accessed September 2020.

Management Authority[74] (Rockland Green). Post-meeting research on both operations appears below.

- The Authority processes yard waste at its Green Waste Compost Facility[75] and food waste through its Food2Energy[76] anaerobic digestion program. The Compost Facility receives yard waste from approximately 17 area municipalities and private haulers, business, institutions, and landscapers; finished compost is US Composting Council STA certified. The Food2Energy program takes residential, commercial, and grocery food waste and depackages it using a THOR Turbo Separator Model T42[77] from Scott Equipment Company[78]. The depackaged food waste is co-digested with municipal sludge at the Oneida County Sewer District Water Pollution Control Plant's (WPCP)[79] anaerobic digesters. The $2.7 million project received 50% reimbursement from NYS DEC's MWRR Program; project costs were used for transfer station upgrades, SSO processing equipment, and sanitary sewer upgrades.[80] The resulting waste sludge from digestion operations is incinerated. The sludge incinerator ash is landfilled.
- Under contract to Rockland Green, WeCare Organics operates a Co-composting Facility[81] that recycles biosolids from Rockland County WWTPs into compost suitable for golf courses, flower beds, and landscaping projects. Biosolids are mixed in "an in-vessel (enclosed) agitated bin composting plant" with clean woody wastes, including tree parts, brush, pallets, and lumber.[82] The compost product is sold only by contract by WeCare Organics and not for sale to residents.

- Events:
  - The Clearwater Festival was mentioned as a model for diversion practices at events. UCRRA has accepted food waste from this event.
  - Clearwater's Zero Waste webpage[83] notes that it has diverted 21.25 tons of recycling and 30.27 tons of compost since the Festival began tracking baseline weights and percentages for refuse, recycling, and compost in 2013. The combined total represents a diversion rate of 80%. The Festival's volunteer Zero Waste Committee manages the

[74] "Rockland Green", Rockland County Solid Waste Management Authority, https://www.rocklandgreen.com/. Accessed September 2020.

[75] "Green Waste Compost Facility", Oneida-Herkimer Solid Waste Authority, https://www.ohswa.org/compost/our-facilities/compost-site/. Accessed September 2020.

[76] "Food2Energy", Oneida-Herkimer Solid Waste Authority.

[77] The T42 swing hammer power technology with durable screens is capable of processing cased and bagged goods with minimal shredding, producing 99% clean organics and clean packaging.

[78] "TurboSeparator", Scott Equipment Company, https://www.turborecycling.com/. Accessed September 2020.

[79] The Authority's Eastern Transfer Station is adjacent to the WPCP.

[80] The Authority's Food2Energy operation is based on Barton & Loguidice's 2017 Source-Separated Organics Feasibility Study, prepared on behalf of the Authority. Anaerobic digestion was selected as an organics diversion method based on a number of factors: a previously planned anaerobic digestion complex at the WPCP, the energy recovery potential, sale of excess power to the grid, increased efficiency of the digesters and greater energy production and recovery from co-digestion with food waste, and higher biogas (methane) collection rate when compared with landfill gas generation (p. 4-5).

[81] "Co-Composting Facility", Rockland Green, https://www.rocklandgreen.com/facilities/co-composting-facility/. Accessed September 2020.

[82] Rockland County Solid Waste Management Authority et al, Rockland County Solid Waste Management Plan, September 2014, p. 5-16. https://www.rocklandgreen.com/vs-uploads/pdfs/1513619821_Solid-Waste-Management-Plan-DRAFT.pdf.

[83] "Zero Waste", Clearwater, https://www.clearwaterfestival.org/zero-waste/. Accessed September 2020.

event's waste diversion. A best practice important to the Festival's diversion success is the stationing of Zero Waste Volunteers at three-bin waste stations (Figure 1). Additional best practices include vendor use of compostable or recyclable service ware and iconographic information sheets affixed to each waste bin. The Festival accepts all food waste, paper napkins, paper plates and cups, compostable plastics (utensils and cups), and wooden skewers, chopsticks, and utensils. Any compostable service ware must meet UCRRA's stringent requirements as their policy regarding acceptable compostable products continues to change with industry knowledge of best practices.

Figure 1. Zero Waste Volunteers at three-bin waste stations. Each bin is labeled – refuse, recycling, and compost – and has an attached iconographic information sheet. (Source: Clearwater Festival website.)

- Drop-off Programs: Food scraps drop-off programs at transfer stations will be more successful at locations more regularly frequented, like the Towns of Saugerties, Woodstock, and Marbletown. The City should assess the success of a drop-off program at its transfer station. Community gardens or drop-off locations at suitable locations in local neighborhoods would have greater participation rates.

C.3. COMMUNITY COMPOST COMPANY

Eileen Banyra, founder & president of Community Compost Company[84] (CCC) and board member of the US Composting Council Board of Directors was interviewed on February 28, 2020. The interview focused on obtaining input on the potential roll-out of a food scraps collection program for the City of Kingston.

1. OVERVIEW

As an important participant in the food scraps collection sphere in the Mid-Hudson Region, CCC shared important experiences encountered in the management of its business. **CCC finds that any food waste collection program—whether it be residential curbside collection, drop-off, commercial collection, or events—will not be successful without a comprehensive education component.** Education reduces contamination rates, results in the production of a good, finished product, and ensures long-term program viability. Education is also time consuming and requires strong relationships with local partners and/or volunteers who will deliver the education needed to ensure programmatic success. **CCC's recommended locked drop site model is worthy of consideration, particularly when partnered**

[84] CCC, https://www.communitycompostco.com/. Accessed November 2020.

with a strong educational component. Of particular note is program support that CCC could provide to the City for drop-off locations, which is detailed in the CCC Input section.

2. CCC BACKGROUND

CCC is a woman-owned business founded by Banyra in 2013. CCC is based in the Hudson Valley and Northern New Jersey. Food waste collected by CCC is composted by the company at Arrowhead Farm Agricultural Center[85] in Kerhonkson in Ulster County using an aerated static pile system. CCC's municipal clients include the City of Hoboken and Jersey City, Town of Saugerties, as well as commercial clients such as Rough Draft, Stone Soup, Woodland Pond at New Paltz, Bread Alone, Radio Kingston, and Diego's Taqueria. CCC does not accept compostable products because "these products are not accepted for producing a certified organic compost."[86]

Figure 2. CCC staff collecting food scraps door-to-door and delivering clean buckets, left. Advertisement for a drop spot location, center. Typical food scraps, right. (Source: Community Compost Company.)

CCC's current residential collection services[87] in the Mid-Hudson region are concentrated in the areas of the City of Beacon, Town and Village of New Paltz, Town of Rosendale, and City of Kingston. The residential collection services are on a paid subscription basis with registration. CCC provides 5-gallon buckets for weekly or bi-weekly collection to its door-to-door customers. Compostable bags are not accepted. Customers can receive finished compost twice yearly or CCC donates their share.

Customers who do not desire door-to-door collection can drop off food scraps at one of CCC's four current drop spots listed below. Drop spot participation also requires registration. Participants pay a lower fee.

- Kingston Uptown Farmers Market held at the Ulster County Courthouse Parking lot on Saturdays, 9am-2pm.
- Beacon Farmers Market held at the Beacon VFW on Sundays, 10am-2pm.

[85] The Arrowhead Farm Agricultural Center is located at 5941 US-209, Kerhonkson, NY 12446 and is 19.7 miles one way from the City of Kingston Transfer Station.

[86] "Frequently Asked Questions", CCC, https://www.communitycompostco.com/faq. Accessed November 2020.

[87] In 2019, Zero To Go transitioned its residential compost collection program to CCC. A Little Beacon Blog, "Zero to Go Transitions Residential Compost Pickup to Community Compost Company (CCC)", https://www.alittlebeaconblog.com/blog/zero-to-go-transitions-residential-compost-pickup-to-community-compost-company-ccc. Accessed November 30, 2020.

- Town of Marbletown Transfer Station, 135 Canal Road, High Falls, NY 12440; fee[88] is $1 per drop off.
- Town of Saugerties Transfer Station, 1765 Route 212, Saugerties, NY 12477; the fees[89] are provided on the Town's website.

CCC offers commercial food scraps collection to a range of businesses and institutions, such as offices, retirement communities, schools, restaurants, and food processors. CCC assists commercial customers with selection of the appropriate bin size for their food scraps production. For example, small offices generally use a 5-gallon bucket and larger food producers can require 32- or 48-gallon wheeled toter(s).

CCC also collects food scraps from events such as weddings, festivals, conferences, and parties on a case-by-case basis. CCC works closely with events organizers to ensure low contamination rates.

Collection of food scraps is managed by CCC staff. CCC also accepts material via tipping at their facility at Arrowhead Farm Agricultural Center from other haulers, large food waste generators, and municipalities interested in diverting food scraps from the municipal waste stream.

CCC established Hudson Soil Co. in 2016 as its soil products division. Hudson Soil Co. sells finished compost "in bags and bulk to garden centers, home gardeners and landscaping companies." Finished compost is "approved for organics use, third party tested by Soil Control Lab, and has the US Composting Council's Seal of Testing Assurance".[90] Hudson Soil Co. compost is sold at various locations in New York and New Jersey. New York locations include Hudson Valley Seed Company, Catskill Native Nursery, Wallkill View Farm, and Whole Foods locations throughout NYC, Northern New Jersey, and Westchester County. [91]

To date, CCC has diverted from landfills and composted over 5.6 million pounds of food scraps, resulting in the reduction of GHG emissions equivalent to 4.9 million MTCO2E, and 505,726 gallons of gas avoided.[92]

3. CCC INPUT

Stakeholder input focused on, in order of conversation, weight of household food waste collected, contamination rates, compostable products, neighborhood drop sites, fostering behavior change, hauling, and the importance of education and outreach. Of particular note is program support that CCC could provide to the City for drop-off locations, outlined below in the Program Support to Kingston section. A synopsis of the input shared is listed below by topic area.

- Weight of Household Food Waste Collection: CCC's independent study has found that households produce a maximum of 10-11 pounds weekly of food waste.

[88] "Transfer Station", Town of Marbletown, https://www.marbletown.net/transfer-station. Accessed November 30, 2020.

[89] "Transfer Station (and Animal Shelter)", Town of Saugerties, https://townsaugerties.digitaltowpath.org:10234/content/Offices/View/14. Accessed November 30, 2020.

[90] "Compost", Hudson Soil Co., http://www.hudsonsoil.com/ourproducts. Control Laboratories, Compost Testing, http://www.controllabs.com/compost.htm. Accessed November 2020.

[91] "Buy Hudson Soil", Hudson Soil Co., https://www.hudsonsoil.com/bagged. Accessed November 2020.

[92] "Our Impact", CCC, https://www.communitycompostco.com/. Accessed November 2022.

- Contamination: CCC is intent on building quality agricultural soils.
    - CCC's education component has been integral to low contamination rates in collected food scraps.
    - Although door-to-door collection has a lower contamination rate than food scraps collected from drop spots, overall contamination rates are low and acceptable due to CCC's education delivery. Drop spots initiated without an education component have a high contamination rate.
    - Municipal food scraps collected by CCC are checked for contamination. Contamination rates at one percent or higher pay a contamination fee. This practice has been very effective in low contamination rates for 95% of deliveries. CCC attributes the low contamination rates to program education provided prior to and in concert with program roll-out.
- Compostable Products: CCC does not accept compostable products (bags, cups, flatware, etc.). The company accepts all food waste and uncoated paper only. Initially, CCC accepted compostable bags but moved away from the practice to obtain the NOFA-NY organic certification seal. Additionally, based on CCC's research and experience, the acceptance of compostable products leads to higher overall contamination rates at compost sites, especially in drop-off programs, as customers mistake compostable plastics for regular plastics and include those items as well. Limiting the stream to only food waste and uncoated paper allows CCC to ensure a high-quality, organic end product.
    - CCC does use compostable bags in their commercial collection program only in winter when weather prevents the use of CCC's on-truck power washer. However, bags are removed on the route during the service of each bin and taken to another location for composting.
    - CCC has found that residential program customers understood and readily accepted not using compostable bags once they learned of CCC's objectives. As part of the door-to-dor service, CCC uses paper bags to line their 5-gallon buckets.
- Community Drop Spots and 3-Bin Systems:
    - CCC has found drop spots to be very attractive to residents who are interested in composting, but may not be willing/able to pay for door-to-door service and cannot or will not backyard compost. CCC's experience has shown resident willingness to travel a quarter of a mile to drop off food waste at a drop spot.
    - CCC has over 30 food scrap drop off locations in northern New Jersey and the Hudson Valley.
    - Additionally, CCC has partnered with several community gardens in northern New Jersey and the Hudson Valley to build 3-bin systems for small scale on-site processing of food scraps.
    - At each location, CCC builds-out the 3-bin system and provides training to the volunteers who manage the processing of compost.
    - All drop-off participants receive composting education and are informed of the no-compostable products policy.
    - CCC believes that the use of finished compost is a critical component for residential and drop spot composting programs. Customer use of the finished compost helps participants understand the end goal of diverting food waste from the waste stream: giving a second life to food waste and applying it for productive purposes, such as soil

amendments for gardening and farming as well as improved permeability when applied to municipal roadway projects.

- Behavior Change: CCC customers have been awed to understand firsthand the amount of food waste they personally throw away. Understanding the linkage between food originally wasted, and the finished compost product received as a result of participation in food waste diversion, has supported and expanded participant behavior change. CCC has found that formerly skeptical participants have modified their source separation practices and even reduced food waste through simple practices like planning meals and food shopping with a list.[93]
- Hauling:
    - Collection of food scraps is the most expensive component of CCC's business model, with the cost of repairs to hauling equipment and retention of food scraps collection staff being the most difficult.
    - CCC recommends the City proceed cautiously with food scraps collection program design due to the high cost of collection, managing contamination, and the need for a thorough and ongoing educational component for municipal sanitation laborers. Additionally, the City would need to identify parties responsible for contamination checks and removal of contaminants.
- Education: CCC believes UCRRA educators could play an important role in supporting the educational efforts of a City of Kingston food scraps collection program. Any program developed by the City will require a comprehensive education and outreach component. Leading with education and incentives will position the City for long-term success.
- Program Support to Kingston: CCC identified potential program components where it could support a possible Kingston food scraps collection program.
    - CCC would be open to managing drop-off locations. CCC could provide consultation and guidance for the educational components as it does with current municipal partners. The execution of the education component could be provided by the City and supplanted by UCRRA educators.
    - Pricing would be provided for the management of a set number of drop spots, including collection of food scraps from these locations.
    - Drop spots would be accessible to registered participants twice weekly, such as Sunday and Thursday. Limited accessibility reduces inappropriate use of drop site bins, such as being mistaken for waste bins.
    - CCC recommends locked access to drop spot bins to ensure use by registered participants. Limited access of locked drop-off sites is preferred to a site with coded locks to ensure that collection bins are clean and suitable for use by drop site participants. Clean bins with no foul odor extend program participation.
    - CCC recommends the City identify locations regularly frequented by Kingston residents as potential drop spot locations, such as the YMCA.
    - CCC could train potential drop spot location partners, such as the YMCA, to manage the drop-off location and respond to participant questions.

[93] The Natural Resources Defense Council estimates that a household of four typically throws away $1,800 in uneaten food annually. "Wasted: How America is Losing Up to 40 Percent of its Food from Farm to Fork to Landfill", NRDC, https://www.nrdc.org/resources/wasted-how-america-losing-40-percent-its-food-farm-fork-landfill. Accessed November 2020.

- Drop sites with presence have less contamination issues. Having persons available to respond to questions or provide guidance has proven to reduce contamination rates.

2. WASTE ASSESSMENTS

A. WASTE ASSESSMENTS OVERVIEW

The Waste Assessments section of this Study provides an overview of the findings from the assessments completed for municipal buildings, municipal recreation facilities, and events. Details on the assessments as well as waste sort processes are found in City of Kingston Organics Diversion Study – Appendices, Appendix B. Waste Assessments.

A.1. BACKGROUND

Waste assessments are used to determine the types of waste produced and a snapshot of waste amounts produced during the period assessed. Waste assessments can include examination of records, facility walk-throughs, and waste sorts,[94] or any combination of the three. Records examinations use logs, invoices, waste hauling and disposal records and contracts to identify costs and revenues from waste collection and disposal. Facility walk-throughs involve touring facilities to observe function areas or activities, speaking with staff about their waste-production and disposal practices, identifying current waste reduction efforts, and observing the types and amounts of waste produced. Waste sorts involve the collection, sorting, and weighing of an organization's waste according to the waste categories being assessed.

This study employed all three approaches for different areas of this study; each approach and where it was employed are bulleted below. An accounting of all municipal facilities informed what waste assessment approach would be undertaken at which facility type. The Unites States Environmental Protection Agency (US EPA) WasteWise Waste Assessment Approaches[95] and CleanRiver's "How to Complete a Waste Audit in 5 Easy Steps"[96] guided the processes developed for this study. Guidance was also provided by NYS DEC Wildlife Technician Amy Bloomfield[97]. The results from facility walk-throughs and waste sorts will be discussed in this section.

- Records examinations were employed for all municipal waste collected from municipal buildings, municipal facilities, and events staffed by municipal staff.
- Facility walk-throughs were conducted for municipal buildings and recreation facilities, both indoor and outdoor.
- Waste sorts were conducted for municipal buildings, recreation facilities, and four events.

A.2. FACILITY SELECTION

The determination of which municipal facilities to include in the waste assessment process began with an analysis of facilities in the City's ENERGY STAR Portfolio Manager Program (Portfolio Manager)

[94] Waste sorts are also referred to as waste audits.

[95] "WasteWise, Waste Assessment Approaches", US EPA, https://archive.epa.gov/epawaste/conserve/smm/wastewise/web/html/approach.html. Accessed March 2018.

[96] "How to Complete a Waste Audit in 5 Easy Steps", CleanRiver, https://cleanriver.com/waste-audit-in-5-easy-steps/. Accessed March 2018.

[97] Amy Bloomfield, NYS DEC Wildlife Technician, telephone interviews on June 11, 2018 and September 25, 2018.

listing.[98] The original listing of 53 facilities were reviewed and assessed for potential sources of food waste production. Facilities without employees nor any food waste production were removed, such as pump stations. To this remaining list were added recreation facilities, including parks and pavilions. The finalized list of 29 facilities appears as Table 2. Kingston-Owned Properties Assessed for Waste Assessment Inclusion. It should be noted that the information collected in Table 2 represents preliminary information, which may differ from the finalized information collected during the waste assessment process and discussed later in this section. The below bullets also provide additional details on those facilities not included in the municipal waste sort and/or facility walk-throughs conducted.

- Organics Available: This column denoted whether food waste was part of the waste stream at each facility listed. Where food waste was known to be present "Y" for yes is found; where food waste was not known to be present, "N" for no is noted. During initial discussions of waste sort candidates, it was unclear whether recreation facilities with pavilions would be candidates for a food scraps collection program; these properties appear with a question mark ("?"). Empty cells in this column indicate that those recreation facilities with pavilions were not originally identified for a waste sort, but were subsequently included (see section "Municipal Recreation Facilities" in this Study). It was also unknown whether food waste would be found at the Water Treatment Campus facilities or the Building Safety and Zoning Enforcement, resulting in "?" for unknown.
- Waste Sort: This column identified whether the facility would be included in a waste audit of municipal facilities' waste. "Y" for yes indicated the facility would be included; "N" for no indicated it would not be. All recreation facilities were included, as were most structures. The Water Treatment Campus structures were not included as the employee count was understood to be very low. The Police Station and Courthouse were not included due to privacy concerns. The DPW Campus properties were not included due to contamination concerns.
- Facility Walk-Thru: Of those properties removed from the waste sort, the DPW Campus properties were included in a facility walk-through, which was conducted by the Environmental Education and Sustainability Coordinator.
- Property Name: The naming conventions for the municipal facilities originally included in the City's Portfolio Manager listing were standardized. Generally, facilities with similar uses located at different addresses were listed separately. In a few cases, facilities that were listed as part of the same campus for energy usage purposes were listed separately due to the differences in waste collected at the sites; see Dietz Municipal Stadium Campus, Water Treatment Campus buildings, and Forsyth Nature Center Campus.
- Waste Collected By: For the development of the municipal organics collection plan, it was important to understand the City department responsible for collecting waste. Waste collection for all facilities listed was handled by either the DPW or Parks & Rec staff.
- Waste Collection Schedule: Waste collection schedules were gathered to gain an understanding of the frequency with which waste was collected throughout the year. The

[98] ENERGY STAR Portfolio Manager is a program of the United States Environmental Protection Agency and United States Department of Energy (https://www.energystar.gov/buildings/benchmark?s=mega). The NYSERDA Clean Energy Communities (CEC) Program incentivizes communities to benchmark, or measure and track, energy usage across municipal building stock as a means of understanding where energy efficiency improvement dollars may best be spent. The City benchmarks it municipal building stock as a participant in the NYSERDA CEC Program (https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Communities).

information included was based on the best-known schedule and/or during facility walk-through interviews. The schedule for recreation facilities with pavilions was determined from weigh slips data. Recreation facilities ranged from one to seven days per week, depending on the season, with greater collection frequency during the months with increased use. Structures that functioned as offices received daily waste collection. Firehouses received weekly collection. The Police Station and Courthouse receive twice weekly collection. Everette Hodge Community Center received weekly collection most of the year, increasing to twice weekly during the summer.

- Waste Collection Container: Initial waste collection information found that waste was collected by staff in a variety of receptables. All recreation facility waste was known to be collected in bags by Parks and Recreation staff. Refuse in most City buildings was understood to be collected in bags while recycling was placed directly in cans/totes without liners. The Public Works Building at Wilbur and Police Station and Courthouse waste was collected by DPW staff from dumpsters. Everette Hodge Community Center waste was understood to be collected in totes. City Hall was understood to be collected from bags and cans for refuse as well as bags, cans, and totes for recycling. DPW administrative offices and garage waste was understood to be collected from bags and cans for refuse as well as totes for recycling. Water Treatment Campus waste was understood to be collected by Water Treatment employees and brought directly to the Kingston Transfer Station.
- Collection Location Info: This column provides information regarding the location from which all waste was collected as understood prior to conducting the waste audit.
- Waste Sort Notes: The Waste Sort Notes column consists of coordination information conveyed to participating staff and laborers for the collection of waste for the waste sort. Included in the notes are specific persons engaged during the process, such as Parks & Rec staff Angel Lefty Castro, Steve Freer, Bart Robins (former), and Arthur Appollonia as well as former DPW Laborer Foreman Mike McCreery and former DPW Operations & Finance Administrator Mary Jo Wiltshire. Police Station and Courthouse notes indicate that visitors are not expected to bring food into the building.
- Possible Sources of Food Waste: This column lists all the expected possible sources of food waste from each municipal facility that was considered for a waste sort or facility walk-through. Most food waste was anticipated to come from employee meals and meetings with food. Exceptions are noted below.
    - Forsyth Nature Center Campus was expected to have significant animal waste, landscaping organic waste, and spoiled/spent animal food.
    - The three neighborhood centers with ongoing public engagement and activities (Everette Hodge, Andy Murphy Midtown, and Rondout) were expected to have food waste resulting from onsite activities and events.
    - Dietz Municipal Stadium Campus structures were expected to have food from events held onsite.
    - At the time of the walk through, the Waste Water Treatment Plant was expected to produce dehydrated sewage pellets in addition to food waste from employee lunches. This is no longer the case.
    - A few recreation facilities (Andretta Pool, Hasbrouck Park Stone Building) were expected to produce increased food waste during the summer months from summer camp

programming. The same was expected of pavilions used for summer camp programming.

- Property Use Notes: Information collected in this column primarily focused on time of operation, whether 24-hours, annual, or seasonal. The availability of kitchens or break rooms were noted for a few facilities.
- Employees or Avg # Persons / Day, Estimated: This column lists the number of employees on average known to use each facility.
- Street Address & Year Built: These columns provide the known street address and year of construction for each facility considered for a waste audit or facility walk-through.
- Primary Function: This column lists the primary function for all facilities. Those with the first word capitalized are categories taken from Portfolio Manager.
- Gross Floor Area (sq.ft.) & # Bldgs: The gross floor area noted in square feet and number of buildings associated with each facility are taken from the Portfolio Manager data.

Table 2. Kingston-Owned Properties Assessed for Waste Assessment Inclusion

KINGSTON-OWNED PROPERTIES ASSESSED FOR WASTE ASSESSMENT INCLUSION																
Organics Available	Waste Sort	Facility Walk-Thru	Property Name	Waste Collected By	Waste Collection Schedule	Waste Collection Container	Collection Location Info	Waste Sort Notes	Possible Sources of Food Waste	Property Use Notes	Employees or Avg # Persons / Day, Estimated	Street Address	Year Built	Primary Function	Gross Floor Area (sq.ft.)	# Bldgs
	Y	Y	Academy Green Park	Parks & Rec	1-5/wk depending on season	bags	4 cans spread throughout park	Parks & Recreation laborers were informed of waste sort. Laborers and staff transported waste (trash and recycling) to FNC horse barn on the day of the sort on Aug. 4, 2019.	waste containers	operates seasonally	n/a	2-50 Albany Avenue		public recreation		
?	Y	Y	Andretta Pool	Parks & Rec	1-5/wk depending on season	bags	1 can inside one outside	See Academy Green Park note.	vending machine, summer camp lunches, public brings in food	operates seasonally	varies- dozens in June-Aug, none rest	76 N Front Street	1975	Swimming Pool	3,100	1
Y	Y	Y	Andy Murphy Midtown Neighborhood Center	Parks & Rec/DPW	1-5/wk depending on season, Recycling put out Mondays for DPW	bags/cans	parking lot	Lefty Angel Castro got 4 brown totes from the Nature Center and putting them at the AMNC, outside, under the fire escape today. Trash was already cleared from building. Trash and recycling (there is already a blue tote there) were put in those totes from Dec. 7 until next Thursday, Dec. 13, 2018. Laborers were all informed of this. On Dec. 13 after lunch, laborers dumped all waste into one dump truck and recycling into a bag that will go into the same truck. Parks staff assisted. This truck was driven to FNC and left there at the horse barn with the trash/recycling in it. Parks brought full truck back Saturday to Midtown for normal Monday hauling.	lunches, vending machines; senior programming with food couple times/week; large events hosted in building generate food several times per year	break room with small fridge in Rec	17-21 rec employee lunches	467 Broadway	1879	Fitness Center/Health Club/Gym	30,831	1
	Y	Y	Barmann / Metro Park Pavilion	Parks & Rec	1-5/wk depending on season	bags	2 cans spread around park	See Academy Green Park note.		operates seasonally	varies	2 S. Prospect Street, 2-36 R S. Prospect Street		public recreation		
?	Y	Y	Block Park Pavilion, bathrooms	Parks & Rec	1-5/wk depending on season	bags	8 cans spread around park	See Academy Green Park note.		operates seasonally	varies	208-304 Abeel Street		public recreation		
Y	Y	Y	Central Firehouse	DPW	weekly, Wed.	bags/cans	Jansen Ave	Trash and recycling collected inside as normal for the week. Trash and recycling put out to the curb as normal for the week. Mike McCreery picked it up with his truck Wednesday morning, dropping it off at FNC, keeping it separated.	employee breakfast, lunch, dinner, paper towels	operates 24 hours	16 employees	19 East O'Reilly Street	1908	Fire Station	10,140	1
Y	Y	Y	City Hall	DPW	every day	trash: bags & cans recycling: bags, cans, & totes	behind by handicap spots	Trash and recycling collected inside as normal and put out to the "curb" (parking spot) as Abidi does normally every day/night. Mike McCreery, who normally comes to get it daily, brought it to FNC instead and put it in two separate totes in the back by the horse barn (recycling and trash separate), as requested by Mary Jo Wiltshire.	Lunches, meetings with food	no lunch room or break room, no kitchen	40 Employees	420 Broadway	1874	Office	24,906	1

KINGSTON-OWNED PROPERTIES ASSESSED FOR WASTE ASSESSMENT INCLUSION																
Organics Available	Waste Sort	Facility Walk-Thru	Property Name	Waste Collected By	Waste Collection Schedule	Waste Collection Container	Collection Location Info	Waste Sort Notes	Possible Sources of Food Waste	Property Use Notes	Employees or Avg # Persons / Day, Estimated	Street Address	Year Built	Primary Function	Gross Floor Area (sq.ft.)	# Bldgs
Y	Y	Y	Dietz Municipal Stadium Campus: Concession Stand	DPW	Tuesday	bags	dumpster, 10 cans spread through grandstands- placed in dumpster	See Academy Green Park note.	food, paper towels	operates year round	dozens to hundreds	170 North Front Street	2016	Food Sales	10,780	1
Y	Y	Y	Dietz Municipal Stadium Campus: Stadium	Parks & Rec	Tuesday	bags	dumpster, 10 cans spread through grandstands- placed in dumpster	See Academy Green Park note.	concession stand food, patrons bring in food, paper towels from bathrooms	operates year round	dozens to thousands	170 North Front Street	1939	Stadium (Open)	52,421	3
Y	N	Y	DPW Campus: Admin offices & Garage	DPW	not specific	trash: bags & cans; recycling: totes	Not specific		lunches, vending machines, paper towels	operates year round; concerns about contaminants	31-70 Employee	464 Hasbrouck Avenue	1930	Repair Services (Vehicle, Shoe, Locksmith, etc.)	26,950	3
Y	N	Y	DPW Campus: Public Works Building at Wilbur	DPW	Monday	dumpster	in campus		employee lunches, paper towels	operates year round; concerns about contaminants	15 employees	454 Wilbur Avenue	1950	Office	2,240	1
Y	Y	Y	Everette Hodge Community Center	Parks & Rec	weekly, Mon. summer: 2x/wk, Mon. & Thu.	totes	Franklin side	Trash went out Monday as normal. Trash and recycling collected next week as normal. Dec. 13, Parks staff with a laborer collected trash/recycling into the back of the same truck, sorted, and brought to FNC, to leave truck overnight.	breakfasts, lunches, snacks all year, paper towels, evening event organics	Commercial Kitchen	60-80 kids daily, evening meetings	15-21 Franklin Street	1996	Social/Meeting Hall	3,600	1
Y	Y	Y	Forsyth Nature Center Campus	DPW	Tuesday	bags	dumpster at Horse Barn	See Academy Green Park note.	animal waste; landscape compostables, spolied/spent animal food	operates year round	dozens to hundreds	157 Lucas Avenue	1936	Zoo	1,250	4
Y	Y	Y	Forsyth Nature Center Campus: Main Building	DPW	Tuesday	bags	put in dumpster at Horse Barn	See Academy Green Park note.	spoiled/spent animal food	operates year round	1	157 Lucas Avenue	1936	Zoo	1,103	1
?	Y	Y	Forsyth Park Pavilion, bathrooms	Parks & Rec	1-5/wk depending on season	bags	9 spread around park	See Academy Green Park note.	waste containers	operates seasonally	varies	125 Lucas Avenue		public recreation		
?	Y	Y	Hasbrouck Park Pavilion, bathrooms	Parks & Rec	1-5/wk depending on season	bags	2 spread around park	See Academy Green Park note.	waste containers	operates seasonally	varies	375-405&R Delaware Avenue		public recreation		
?	Y	Y	Hasbrouck Park Stone Building	Parks & Rec	1-5/wk depending on season	bags	3 spread around park	See Academy Green Park note.	summer camp lunches and snacks; regular party remains from rentals	operates seasonally	varies	375-405&R Delaware Avenue	1919	Social/Meeting Hall	1600?	1
?	Y	Y	Hutton Park Pavilion, bathrooms	Parks & Rec	1-5/wk depending on season	bags	4 spread around park	See Academy Green Park note.	waste containers, but not bathrooms	operates seasonally	varies	2-50 Sherman Street, 116-126 Vangaasbeck Street		public recreation		

KINGSTON-OWNED PROPERTIES ASSESSED FOR WASTE ASSESSMENT INCLUSION																
Organics Available	Waste Sort	Facility Walk-Thru	Property Name	Waste Collected By	Waste Collection Schedule	Waste Collection Container	Collection Location Info	Waste Sort Notes	Possible Sources of Food Waste	Property Use Notes	Employees or Avg # Persons / Day, Estimated	Street Address	Year Built	Primary Function	Gross Floor Area (sq.ft.)	# Bldgs
?	Y	Y	Kingston Point Park Pavilion, bathrooms	Parks & Rec	1-5/wk depending on season	bags	6 spread around park	See Academy Green Park note.	waste containers, but not bathrooms	operates seasonally	varies	41-53 Delaware Avenue		public recreation		
?	Y	Y	Loughran Park Pavilion, bathrooms	Parks & Rec	1-5/wk depending on season	bags	3 spread around park	See Academy Green Park note.	waste containers, but not bathrooms	operates seasonally	varies	50 Charlotte Street		public recreation		
Y	N	N	Police Station and Courthouse	DPW	Tue. & Fri.	dumpster	behind in prk lot	visitors not supposed to bring food.	employee lunches	operates year round	40	5 Garraghan Drive	1971	Police Station	25,907	1
	Y	Y	Rondout Building & Safety	DPW	daily from office; weekly, Tue. from building	bags/cans totes for recycling	Front of bldg	Trash and recycling collected inside as normal for the week. Trash and recycling put out to the curb as normal for the week. Mike McCreery picked it up with his truck Tuesday morning, dropping it off at FNC, keeping it separated.	employee breakfast, lunch, dinner, paper towels	operates year round	8.5	5 Garraghan Drive	1971	Office	see Fire Station	2
Y	Y	Y	Rondout Fire Station	DPW	weekly, Tue.	bags/cans totes for recycling	Front of bldg	Trash and recycling collected inside as normal for the week. Trash and recycling put out to the curb as normal for the week. Mike McCreery picked it up with his truck Tuesday morning, dropping it off at FNC, keeping it separated.	employee breakfast, lunch, dinner, paper towels	operates 24 hours	8 employees	5 Garraghan Drive	1971	Fire Station	7,341	2
Y	Y	Y	Rondout Neighborhood Center	Parks & Rec	daily, Mon.-Fri.	bags/totes	Spring St	Lefty Angel Castro got 4 additional totes from the Nature Center, brougt them there and put them with the others. Steve Freer instructed Arty to put all trash and recycling into totes. Headstart instructed to do the same. Dec. 13 after lunch, Parks staff and a laborer collected this and put in back of same truck, with waste sorted by bag.	snacks and meals	operates year round	20-32 kids & staff daily	103 Broadway	1971	Pre-school/Daycare	11,070	1
?	Y	Y	Rotary Park Pavilion, bathrooms	Parks & Rec	1-5/wk depending on season	bags	`13 spread around park	See Academy Green Park note.	waste containers, but not bathrooms	operates seasonally	varies	Landing at Kingston Point		public recreation		
?	Y	Y	TR Gallo Park/Strand bathrooms	Parks & Rec	1-5/wk depending on season	bags	8 spread around park, 6 more along promemade	See Academy Green Park note.	waste containers, but not bathrooms	operates seasonally	varies	1 Broadway		public recreation		

KINGSTON-OWNED PROPERTIES ASSESSED FOR WASTE ASSESSMENT INCLUSION																
Organics Available	Waste Sort	Facility Walk-Thru	Property Name	Waste Collected By	Waste Collection Schedule	Waste Collection Container	Collection Location Info	Waste Sort Notes	Possible Sources of Food Waste	Property Use Notes	Employees or Avg # Persons / Day, Estimated	Street Address	Year Built	Primary Function	Gross Floor Area (sq.ft.)	# Bldgs
Y	Y	Y	Uptown Firehouse	DPW	weekly, Tue.	bags/totes	Frog Alley	Trash and recycling collected inside as normal for the week. Trash and recycling put out to curb as normal for the week. Mike McCreery picked it up with his truck Tuesday morning, dropping it off at FNC, keeping it separated.	employee breakfast, lunch, dinner, paper towels	operates 24 hours	16 employees	30 Frog Alley	1979	Fire Station	6,603	1
	Y	Y	Van Buren Park	Parks & Rec	1-5/wk depending on season	bags	1 near entry	See Academy Green Park note.	waste containers	operates seasonally	varies	45-49 Vanburen Street		public recreation		
?	N	N	Water Treatment Campus: Building	KWD	as needed brought directly to transfer station	n/a	n/a		employee lunches, paper towels	operates year round	5	Woodstock	2016	Other - Utility	11,649	1
?	N	N	Water Treatment Campus: Department Administration Building and Maintenance Garage	DPW	Wednesday	totes	along Jansen Ave		employee lunches, paper towels	operates year round	15	111 Jansen Avenue	2016	Office	8,051	2
?	N	N	Water Treatment Campus: Waste Water Treatment Plant	DPW	Tuesday	bags	in campus		lunches; dehydrated sewage pellets?	operates year round	<10 employee	85-91 E. Strand Street	1950	Wastewater Treatment Plant	1,000	1

B. MUNICIPAL BUILDINGS

B.1. OVERVIEW

An audit of one week's waste was conducted on Saturday, December 15, 2018, on seven municipal structures, representing eight facilities. Included in the sort were the following structures: Andy Murphy Midtown Neighborhood Center (AMNC), Rondout Neighborhood Center (Rondout Center), Everette Hodge Community Center (Hodge), City Hall, Central Firehouse (Central), Rondout Fire Station and Building & Safety (Rondout Fire/B&S), Uptown Firehouse (Uptown). The sort was conducted by eight persons, consisting of City of Kingston staff, volunteers from the Kingston Conservation Advisory Council (KCAC) and the Climate Smart Kingston Commission (CSKC), and Hudson Valley Regional Council (HVRC) staff. Waste collected from the eight facilities over the course of the week was taken to the Forsyth Nature Center Horse Barn, where the sort was completed inside the Barn during a three-hour period from 10:00am to 1:00pm. The outdoor temperature the week of the sort ranged from 36˚ to 45˚ Fahrenheit and was a pleasant 45˚ Fahrenheit on the day of the sort. The week's temperature range minimized waste putrefaction, reducing participants' discomfort during the sort. The warmer temperature on the day of the sort was also beneficial as the Barn is unheated. Twenty-six waste containers were collected, consisting of 25 large totes & one large refuse bag. Twelve of the totes contained recyclables; 13 totes and 1 large bag contained refuse.

The waste audit was followed by two facility walk-throughs. The first walk through, conducted by the Environmental Education and Sustainability Coordinator (Sustainability Coordinator) and HVRC staff on Friday, March 22, 2019, included the seven structures from the waste audit. For the purpose of the walk-through analysis, the structure that housed the Rondout Fire Station and Building & Safety were treated separately as they were distinct and separate uses. An additional walk-through of DPW administrative offices and garage was conducted on Friday, December 6, 2019, by the Sustainability Coordinator. Interviews with staff present at each of the walk-through buildings were incorporated into the March walk-through. December walk-through details were collected by the Sustainability Coordinator, who was working out of those offices. Both facility walk-throughs resulted in more detailed information on waste production and collection practices as well as occupancy and building layout.

The balance of this section, "Municipal Buildings", provides an overview of the waste audit and facility walk-throughs completed for the referenced municipal facilities. It begins with highlights from the audit and walk-throughs, and is followed by an explanation of the waste sort process and detailed findings from each facility. The waste audit findings include sections from each Study; waste sort reports are found in Appendix B. Waste Assessments in this Study's Appendices. The complete facility walk-through reports are found in the Complete Facility Walk-Through Reports in this Study's Appendices. Photographs depicting these two waste assessment processes are included as part of the discussion on findings.

B.2. RECOMMENDATIONS FROM MUNICIPAL BUILDINGS' WASTE ASSESSMENTS

Bulleted below are recommendations related to the implementation of a food waste collection program in municipal buildings.

- **Replace paper towel stations with high-efficiency electric hand dryers.** See full description of recommendation in "Recommendations from Firehouse Staff".

- **Develop an internal and external facing marketing campaign to be rolled out a minimum of 6 months prior to implementation of a food waste collection program.** Any campaign requiring substantive behavioral change for success must be accompanied by a strong marketing campaign. Both internal and external marketing materials explains the various benefits of the program (cost-savings, GHG emissions savings, materials recycling) and the ease of implementation. The marketing campaign for municipal organics diversion would ideally be married to the organics diversion marketing campaign for residents and small business receiving City waste collection as a City-wide campaign would have the greatest participation rate, as was seen with the Philadelphia Recycling Rewards Program, administered by RecycleBank. Appropriate lead time allowed for properly informing program participants prior to implementation of any program introducing a significant change is critical to programmatic success. It will also be critical to preventing the contamination rates seen with recycling and aid in reducing those rates.
- **Incorporate food waste collection guidelines into City's personnel handbook.** Incorporating composting expectations into an official City guidance document will reinforce the new food waste collection policy and establish it as a new cultural norm for current and new City staff.
- **For staff-accessible waste containers, establish a three-bin waste station system for food waste, recycling, and refuse, incorporating clear signage for each receptable.** Without the 24/7 presence of a waste ambassador, clear signage is key to ensuring waste is deposited in the correct container. As is seen from the best practice signage from Appendix H. Case Studies, less words and more images make it easier to follow instructions with a three-bin waste station. The City should reconvene with staff to determine whether desk-top food waste collection containers may be of interest in some offices, rather than just the floor waste station system.
- **At highly trafficked municipal buildings, make a three-bin waste station system available to the general public.** Leading by example is key to programmatic success. Making participation available to constituents in the City's new programs and policies at buildings with high visibility will provide an additional opportunity for communicating new programming. For a multi-lingual municipality like Kingston, visual signage with minimal words will help all constituents participate effectively. Where contamination has been seen to be high, consider making the three-bin waste station with waste ambassadors available during times or events with high attendance. If regularly implemented, over time, highly trafficked buildings are likely to see a reduction in contamination.
- **Develop a green purchasing policy that clearly identifies compostable products allowable for use on City property and for City programming.** The "Compostable Product Options" section in this Study lists numerous product options certified to be compostable and should be used as a guide for specific recommendations in the green purchasing policy. The policy should first and foremost encourage the use of reusable dishware and cutlery when available facilities exist to clean them. It is also recommended that the City confirm the acceptability of compostable materials by the composting facility intended for the City's food waste diversion program. Two of the composting facilities researched in this Study do not accept compostable products, even with BPI certification.

B.2. WASTE AUDIT AND FACILITY WALK-THROUGHS – HIGHLIGHTS

Recommendations resulting from the analysis of waste sort and facility walk-throughs for municipal buildings are found in "Recommendations for Municipal Buildings". Highlights from the findings found in the following sections are bulleted below.

- Annual savings from improved recycling practices and the institution of a composting program were estimated to be $2,285.01. These estimated cost savings do not include additional savings that would be captured from diversion of recyclables from City Hall and Central Firehouse; recyclables could not be assessed as they had been collected prior to the day of the waste sort.
- All City staff that were engaged with during the facility walk-throughs expressed an interest in a food waste collection program for City government buildings. In fact, City Hall staff already demonstrate their commitment to recycling their food waste by making the extra effort to walk food waste to a communal refuse can or take it home.
- The City is fortunate to have a committed group of volunteers from the KCAC and CKSC. It is the rare person who is willing to sort through week-old waste.
- The Sustainability Coordinator's successful coordination of various departments in preparation for the waste sort and on the day of the sort is demonstrative of the collaborative and cooperative nature of City staff.
- A total of 1,332.75 pounds of waste was collected from the seven structures / eight facilities included in the waste sort, with refuse representing the largest portion of the waste stream at 37.20%, followed by recyclables at 36.15%, and then compostables at 26.66%.
- Across all buildings, 17.50% of the waste stream was contaminated. Recyclables and waste were counted as contaminants depending on the waste stream analyzed.
- The total percentage of the waste stream that could be diverted from the landfill was 62.80%, consisting of compostables and recyclables.
- Recycling collection containers were found in most cases to be contaminated by a larger percentage than is currently acceptable under the Chinese National Sword regulation, which only permits a 0.50% contamination rate. The contamination rate for the recycling analyzed was 11.48%.
- The City has comprehensively outfitted office spaces and individual desks with recycling and waste bins.
- Analyzing the waste stream from both refuse and recycling containers revealed that the Hodge produced the highest percentage of compostables by weight, followed by City Hall and Central Fire. By weight, the Hodge also led, followed by AMNC and Rondout Center – all of which are community centers open to the public.
- A comparison of refuse containers revealed that Hodge again had the highest percentage of compostables, followed by Rondout Fire and City Hall. By weight, the Hodge again led, followed by the Rondout Center, and AMNC.
- With regards to recycling containers, the largest proportion of food waste contaminating the recycling waste stream was found at AMNC. Food waste contamination at the other buildings was either minimal or non-existent.
- With regards to paper usage, generally very few bathrooms have electric hand driers. Of the 29 bathrooms visited during the walk-through, 21 (72%) use paper towels and 8 (28%) use electric

hand dryers. City Hall produced the largest portion of paper towels, providing an opportunity to reduce paper towel usage with the installation of electric hand dryers.

- With regards to serving ware usage, reusable dishware and cutlery, when used, are found only at community centers with after-school or summer programs, locations which also have kitchens.
- With regards to waste disposal and collection, no consistency was found in terms of style and size for the communal refuse and recycling bins; this also applies to color selection of liners. No signage was noted for communal recycling bins.

B.3. FACILITY WALK-THROUGHS

Facility walk-throughs were conducted on March 22, 2019, of the seven structures that were included in the waste sort: Andy Murphy Midtown Neighborhood Center (AMNC), Rondout Neighborhood Center (Rondout Center), Everette Hodge Community Center (Hodge), City Hall, Central Firehouse (Central), Rondout Fire Station and Building & Safety (Rondout Fire/B&S), Uptown Firehouse (Uptown). The Sustainability Coordinator organized the walk-through schedule (Figure 3. Facility Walk-Through Schedule), working with representatives from each structure to ensure access to all buildings; walk-throughs were scheduled for times when the structures would be at their busiest to garner a sense of real-time activity. Rondout Fire Station and Building & Safety were assessed separately due to their separate spaces and functions. Separate walk-throughs were conducted of DPW administrative offices building and garage on December 6, 2019. Facility walk-through reports by building and by floor are found in Appendix B. Waste Assessments in this Study's Appendices; the Walk-Thru Observers section of the reports identifies the persons who conducted the walk-through.

Figure 3. Facility Walk-Through Schedule

Organics Facility Walk Through

Friday March 22, 2019

10:00am-6:00pm

Location	Busiest Time	Proposed Visit Time
City Hall 420 Broadway, Kingston, NY 12401	• 8:30-4:30, cleaner there until 10:30 only • Can talk to custodian • 3 floors	10:00-11:00
AMNC 467 Broadway, Kingston, NY 12401	• 11-12 • When all the laborers eat • Will show me where all the bathrooms are and where everyone is • 2 floors	11:00-12:00
Central Fire	• 8-9, 12-1, 5-7 • Has 4 people at any given time • 2 floors, only one really usable space	12:00-1:00
Uptown Fire	• 8-9, 12-1, 5-7 • Has 4 people at any given time • 1 floor	1:00-2:00
Rondout Fire	• 8-9, 12-1, 5-7 • Has 2-3 people at any given time • 1 floor	2:00-3:00
Everette Hodge Community Center 21 Franklin St, Kingston, NY 12401	• 3-5pm • Cook for kids and kids eat and produce waste • Tends to get kids earlier • 2 floors	3:00-4:00
Rondout Center 105 Broadway, Kingston, NY 12401	• 3-5pm • 2 floors	4:00-5:00
Rondout Fire	• 8-9, 12-1, 5-7 • 2 people at any given • 2 floors • Cooking 3 meals a day; no normal eating time, but above time is general eating time	5:00-6:00

1. FINDINGS FROM FACILITY WALK-THROUGHS

Findings by facility and floor from the facility walk-through reports were summarized into Table 3. Municipal Building Walk-Through Summary. The information included in Table 3 is bulleted below by table section: Municipal Building, Waste, Kitchen, Meals, and Bathrooms.

- Municipal Building:
  - Name: name of facility
  - Floor: walk-through information for a facility's specific floor
  - Users: number of staff & public regularly using the space
  - Spaces: count of separately and actively used spaces, including offices, where food waste can be produced and collected; bathrooms not included in count
- Waste:
  - Trash: number of refuse receptacles observed
  - Recycle: number of recycling receptacles observed
  - Collection & Notes: information on collection practices as well as general notes
- Kitchen:
  - Type: notations on type of kitchen, such as "none" or, if building has a kitchen, specifics on availability (e.g., sink, sink & stove, sink & stove & dishwasher)
  - Fridge: number of refrigerators, whether full-size or mini; size type found in Appendix B. Waste Assessments in this Study's Appendices.
  - Micro: number of microwaves present

    - Coffee & Use: number and type of coffee makers present
    - Serving Ware: type of serving ware used, if any (e.g., none, reusable, disposable)
    - Drying: method used to dry hands (e.g., paper towel, cloth towel, electric hand dryer)
- Meals:
    - Space: location at which meals are taken (e.g., lunch area, break room, at desk)
    - Notes: information on food production
- Bathroom:
    - #: number of bathrooms
    - Type: bathroom designation (e.g., men, women, unisex)
    - Drying: method used to dry hands (e.g., paper towel, cloth towel, electric hand dryer)
    - Notes: information on compostable paper produced

Table 3. Municipal Building Walk-Through Summary

Municipal Building				Waste			Kitchen					Meals		Bathrooms			
Name	Floor	Users	Spaces	Trash	Recycle	Collection & Notes	Type	Fridge	Micro	Coffee & Use	Serving Ware	Drying	Space	Notes	#	Type	Drying	Notes
Andy Murphy Midtown Neighborhood Center	1	10	3	5	6	--Lots of recyclables in trash cans in play area.	yes, full, but not used much	2	1	0	disposable	paper	lunch area	--Not much food waste produced by users of space. Ball teams do not bring in food; mostly dispose of recyclable bottles and paper products. --Laborers do not use kitchen. Occasionally there are parties held in lunch room and any food waste goes into trash cans. Do produce banana peels and apple cores.	2	1 men 1 women	electric	no paper towels present
Andy Murphy Midtown Neighborhood Center	2	7	5	1	2	--Bathrooms cleaned at end of day; good possible collection point for compost, or hallway. --Staff have their own personal trash & recycling bins.	none	1	1	1 Keurig	none	see Bathrooms	at desk	--Many staff bring in food daily.	2	1 men 1 women	electric	paper towels also available in women's
Central Firehouse	2	16	10	2	3	--Bin count does not include any bins in office spaces. --Trash and recycling placed in outside bins daily by 9am and collected from outside 1/week. --Normally put out 1 fairly full bag of trash daily because take kitchen trash bag and put other building trash in it. --Trash includes rubber gloves, non-recyclable packaging, not many paper cups. --Lots of paper towels, pull down dispenser.	yes, full	1	1	2 Keurigs; 1 automatic drip	reusable	paper	lunch area	--No food on first floor, only trucks, trash, recycling. --2 meals a day; 1 of the meals is prepared in the kitchen, the other is brought from home. Usually they take care on lunch on their own. This is the routine 7 days/week. --Make coffee 3-5 times per day: coffee grounds. --At the end of every shift, food prepared on that day will be taken home. Food that is not taken home is thrown out by the next shift. No date labels used.	3	unisex	paper	pull down dispenser
City Hall	1	26	7	26	less, not 1:1	--See above. --Food waste taken to hallway trash can beneath south stairwell.	none	5	3	5 Keurigs for 7 offices, 1 not used; 2 automatic drip	none		at desk	--Apple and banana peels, coffee grounds commonly produced.	2	1 men 1 women	paper	lots of paper tissues also used
City Hall	2	17	4	17	15	See above; no central trash can on floor.	none	4	3	1 Keurig; 1 automatic drip	none		at desk	--Apple cores, strawberry tops, banana peels, and coffee grounds commonly produced. --No common location used for disposal of food waste, so food waste taken home or to downstairs trash bins to prevent presence of vermin.	3	1 men 1 women 1 Mayor	paper	paper tissues
City Hall	3	4.5	6	yes	yes	See above; no central trash can on floor.	none	0	0		none		at desk	--Parties sometime held in conference rooms.	2	1 men 1 women	paper	
City Hall, general notes	G				5	Waste collected daily from offices: --Recycling: put out weekly, stored under stairwell until then. --Trash: 2 bags put out daily, not 100% full.								--Waste includes coffee cups, some food waste, and food-soiled plastics that could be recycled if clean(er). --Not much food waste in individual trash cans. Staff usually eats out or are part of the clean-plate club. Has observed most food waste in black trash can next to recycling and soda machine under stairs.				70% bathroom waste is paper towels

Municipal Building				Waste			Kitchen						Meals		Bathrooms			
Name	Floor	Users	Spaces	Trash	Recycle	Collection & Notes	Type	Fridge	Micro	Coffee & Use	Serving Ware	Drying	Space	Notes	#	Type	Drying	Notes
DPW Admin	1	5.5	3			--Trash: weekly. --Food represents <25%.	none	1	1		none		break room	--Lots of take-out coffee cups & food containers. --Lots of fruit peels & candy wrappers.	2	unisex	paper	
DPW Admin	2	3	4	5	3	--Trash: weekly, some contamination. --Recycling: monthly, not much contamination. --Food represents <25% of trash.	yes, full	2	1	1 Keurig used 2-3 times/day	reusable	paper	at desk	--50% brought from home; 50% from take-out. --Lots of candy wrappers and treats; 2-4 disposable coffee cups/day.	4	1 men 1 women 2 unisex	paper	
DPW Garage	1	22.5	1	1	1	--Some contamination on both trash & but not much. --Food represents <25% of trash. --Food thrown out 1 time per week (Fri, 2:30pm).	yes + sink	1	3		none	paper	lunch area	--50% brought from home; 50% from take-out. --Lots of paper towels in trash can + soda cans and take-out bags & containers.	2	1 men 1 women	paper	
Everette Hodge Community Center	1	80	8	6	5	--Bin count does not include any bins in office spaces. --Approximately 2 cans trash produced a day. Cans full of mostly food waste, but also chocolate milk containers, paper plates, paper cups, and paper napkins. Approximately 35% of waste estimated as paper products. Use at least 1 piece of plastic cutlery per meal. --Waste collected 2 times/week (Mon & Thu) in summer and 1 time/week (Mon) during school year. --Summertime waste quantity addressed with additional collection day and totes. Produce approximately 5 full totes weekly. --Use lots of aluminum trays, which are not recycled because do not have staff capacity to wash trays. --AC an issue last year resulting in more pre-consumer food waste. --Recycling can in kitchen used for trash. --No recycling in computer lab.	yes, full	4			disposable	paper	lunch area	--Have both pre- and post-consumer waste; most is pre-consumer. --1 day/week remove food from refrigerators and other areas that needs to be thrown out. Most uneaten food is sent home, as long as it has not been touched; typically consists of apples and bananas. Any food left on communal plate is tossed. --Children are give 1 chocolate milk container and water. Typically a lot of the milk is thrown away. Due to health regulations, a communal pitcher for chocolate milk is not allowed. Children self-serve water from plastic pitchers into plastic cups. --Dishwasher is not used because of difficulty in managing loading and unloading, etc. --Kitchen prepares 85 meals per day, 60 for a non-municipal program and 25 for Rondout Neighborhood Center. Majority of meals have a meat product and may have some bones; most meals have dairy products. Most food purchased in bulk. --4 additional refrigerators associated with Family of Woodstock hunger relief program (15,000 after-school meals .& 7,500 summer meals annually)	2	1 men 1 women	electric	
Rondout Building & Safety	1	8.5	6	1	1	--Estimate that 60% of trash is food waste. --trash and recycling placed in outside containers that share with Rondout Fire. Trash is put to curb Mondays for Tuesday collection; recycling day. --1 bag trash per week estimated. Mike Reilly collects waste weekly from office; when he does not, it remains in the office.	yes	1		1 Keurig; 1 automatic drip	none	paper	at desk	--May cook eggs. Bring in food or order take-out. --Coffee grinds, egg shells, and uneaten food is produced. --Also have an electric griddle.	1	unisex	paper	lots used

Municipal Building				Waste			Kitchen						Meals		Bathrooms			
Name	Floor	Users	Spaces	Trash	Recycle	Collection & Notes	Type	Fridge	Micro	Coffee & Use	Serving Ware	Drying	Space	Notes	#	Type	Drying	Notes
Rondout Fire Station	1	8	6	1	3	--Bin count does not include any bins in office spaces. --2 external waste storage areas shared with Building & Safety. --Trash is put to curb Mondays for Tuesday collection. Recycling on same day. Recycling collected single stream in building. --Unclear how staff collecting waste from outside containers distinguish between bags with trash vs. recycling. Images show irregular use of clear plastic bags. --Gloves and other materials used during calls left at call site or with ambulance.	yes, full	1	1	1 Keurig; 1 automatic drip	reusable	cloth	lunch area	--On average have 3 prepared meals a day, all of which are prepared at the station. This is the routine 7 days/week. --Have pull-down dispenser, but prefer to use hand towels. --Try to bring food home after every 24-hr shift. Do not throw food out daily.	1	unisex	paper	
Rondout Neighborhood Center	1 & 2	32	6	3	0	--Trash is collected daily Monday - Friday. Friday waste stays in building until Monday. --Recycling bin in kitchen used for trash. --Head Start space not visited. Unclear how much food waste Head Start produces. Waste is collected separately in Head Start's own totes, but is combined with Center's trash. --2 trash cans are outside the gym on the 2nd floor.	yes, 1 full; HS don't know	1	1	1 automatic drip	disposable	paper	lunch area	--Produces only post-consumer waste from afterschool program attended by 25-30 children per day. No dishwasher. --Food is sent down daily from the Hodge Center in aluminum trays. Aluminum trays get thrown out. --Use disposable cups, paper towels, paper plates, plastic utensils. Paper plates & plastic cutlery are purchased by Family of Woodstock Kevin Rowe from Sam's Club. --No food produced except for Black History Month. Almost all food received has a meat component. --Sense is that don't have a lot of food waste; most is eaten. On occasion they will make a pot of coffee. --Head Start has its own kitchen, so does not use Center's.	2	1 men 1 women	electric	
Uptown Firehouse	1	16	5	1	2	--Bin count does not include any bins in office spaces. --Trash and recycling placed in outside bins. Trash is put to the curb on Monday for Tuesday collection. Recycling on same day. --Every other day dispose of approx. 1 bag of trash. --Majority of trash is food waste and paper towels. Use pull-down dispenser. Collected soda cans redeemed. --2 external trash tote; 1 recycling tote.	yes, full	1	1	1 Keurig; 1 automatic drip	reusable	paper	lunch area	--2 prepared meals a day, both of which are prepared at the station. Usually they take care of lunch on their own. This is the routine 7 days/week. --Food is brought in on every 24-hr shift. At the end of every shift, food prepared on that day will be taken home. Some shifts throw food out daily, others do not.	1	unisex	paper	--Use lots because wash hands many times a day. Wash hands after every call.

As shown in Table 3, the ten municipal facilities assessed include a total of approximately 74 separately and actively used spaces, including offices, where food waste can be produced and collected across 15 separate floors. A total of 256 staff and public users are assumed to regularly use the spaces during the school year; in the summer months, the count can fall to 159 as summer program participants, mostly children, may spend more time outdoors. The facilities included were later organized by facility type to identify usage patterns for paper, serving ware, food consumption and disposal, and waste disposal and collection. Estimates of waste produced were gathered during walk-through interviews. An overview of the findings follow.

1.1. Paper Usage

- In general, very few bathrooms have electric hand driers. Most use paper towels. All but one of the spaces with kitchens, regardless of size, used paper towels for drying; it is assumed that Head Start also uses paper towels in its kitchen. Of the 29 bathrooms visited during the walk-through, 21 use paper towels and 8 use electric hand dryers (representing 72.00% and 28.00%, respectively).
- City Hall: City Hall has no kitchen. All bathrooms use paper towels. Paper-saving pull towel dispensers are not used. Seventy percent of the bathroom waste is estimated to be from paper towels.
- Community Centers: Community centers have kitchens. The centers use electric hand dryers in bathrooms, but paper in the kitchen/food areas.
- DPW Administrative and Garage Buildings: All have kitchens. Both the kitchen areas and bathrooms use paper towels, but not paper-saving pull towel dispensers.
- Firehouses/Building & Safety: Firehouses have full kitchens. Firefighters wash their hands frequently due to the nature of their work. One firehouse is open to switching to electric hand dryers and others prefer paper towels. One firehouse uses cloth towels in the kitchen. All firehouses have paper towels available in the kitchen and bathroom, using paper-saving pull towel dispensers. Rondout Building & Safety, which shares waste disposal with Rondout Fire Station, uses only paper towels and self-reports large paper towel usage.

1.2. Serving Ware Usage

Reusable dishware and cutlery, when used, is found only at locations with kitchens.

- City Hall: City staff who bring in their own food for lunch use reusable dishware and cutlery.
- Community Centers: Community centers with after-school or summer programs use disposable dishware and cutlery. The Hodge Community Center does not use its available and working dishwasher due to management constraints associated with loading and unloading of dishwasher. Family of Woodstock, which manages after-school food production for the Hodge and Rondout Neighborhood Center, purchases all serving ware.
- Firehouses/Building & Safety: All firehouses use reusable serving ware; Building & Safety has no serving ware.

1.3. Waste Disposal and Collection

There is no consistency to style and size for the communal refuse and recycling bins; this also applies to color selection of liners. There is no signage for communal recycling bins. Generally, office spaces have personal, desk-size refuse and recycling bins.

- City Hall: City Hall refuse and recycling are removed from offices daily, with two bags of refuse disposed of daily. Refuse includes K-cups from City Hall's six Keurig machines. Recyclables are stored on the first floor underneath the staircase next to the soda machine. A sizable amount of disposable coffee cups was found in the refuse. Laborer Foreman McCreery plays an important recycling education role by encouraging participation in City Hall's ink cartridges & toners recycling program.
- Community Centers:
    - AMNC: AMNC refuse cans were heavily contaminated with recyclables; no signage was present at any waste container.
    - Hodge: Hodge estimated that 35% of waste is comprised of paper products; almost full chocolate milk containers are also commonly found in the refuse cans. Hodge waste is collected twice weekly in the summertime and once weekly during the school year. Hodge uses a significant number of aluminum trays, which are not recycled because the Center does not have staff capacity to wash trays.
    - Rondout: Head Start uses a portion of the Rondout Neighborhood Center for its programming. Waste is set out at curbside by Head Start staff and is collected by DPW with the Center's refuse.
- DPW Administrative and Garage Buildings: Refuse is set out weekly for collection and recycling monthly. There was minimal contamination in both bins. Visual inspection noted lots of take-out coffee cups, food containers, and candy wrappers. Packaging makes up a large portion of waste.
- Firehouses/Building & Safety: Refuse and recycling is collected weekly from all firehouses. Central disposes of one fairly full bag of refuse daily, which includes rubber gloves, non-recyclable packaging, and some disposable paper cups. At both Uptown and Rondout, both waste streams are stored outside the stations in separate containers. Uptown disposes of one bag of refuse every other day, the majority of which is food waste and paper towels. Rondout Fire Station shares its external waste storage areas with Rondout Building & Safety. Gloves and other material used during calls are left at call site or with an ambulance. Building & Safety waste is collected weekly by Cleaner Mike Reilly; staff estimate one refuse bag weekly.

1.4. Food Waste Production and Disposal

Food waste production and disposal practices varied across the municipal building types.

- City Hall: Staff at City Hall by and large eat lunch at their desk, whether brought in from home or brought back as take-out, or go out to lunch. Self-reported food waste produced ranges from apple and banana peels, coffee grounds from the three automatic drip coffee makers in the building, and strawberry tops. Additional food waste may come from the occasional party. No food waste is left in office refuse cans to deter any vermin: first floor staff walk to the black refuse can under the staircase with the soda machine to dispose of food waste; second floor staff either take home any food waste or take it down to the first floor refuse can.
- Community Centers: Food waste production varies by community center.
    - AMNC: The Andy Murphy Midtown Neighborhood Center does not produce much from users of the gym space nor from food brought in by staff for lunches. The full first floor kitchen is not frequently used, but parties are held in the adjoining lunchroom. Laborers produce banana peels and apple cores, and occasionally prepare meals in the kitchen. There is a full commercial kitchen in the building.

    - Hodge: The Everett Hodge Community Center has both pre- and post-consumer food waste, self-reporting pre-consumer food waste as the larger quantity produced from the preparation of 85 meals per day. The majority of meals have a meat product, which may have bones. Most meals include a dairy product. Most food is purchased in bulk. Hodge practices family-style plating, which reduces food waste. Some food waste may also be produced from the preparation of 22,000 meals for the Family of Woodstock hunger relief program.
    - Rondout: Rondout Neighborhood Center only produces post-consumer waste from its afterschool program; on-site food production only happens during Black History Month. Most food is eaten by children in the afterschool program. Some coffee grounds are produced.
- DPW Administrative and Garage Buildings: Food scraps at DPW administrative and garage buildings were estimated to represent less than 25% of all waste produced. Food was estimated to be brought from home or purchased as take-out in roughly equal amounts. Food waste is thrown out in the available refuse cans and consists of fruit peels from visual inspection. Food is eaten in the available break room, lunch area, or at one's desk. The DPW garage refrigerator is emptied weekly on Fridays. (None of the DPW Campus properties were included in the waste sort due to contamination concerns. The public works building on Wilbur Avenue was not included in either the waste sort or walk-through.)
- Firehouses/Building & Safety:
    - Food Waste Production: Food waste production at Central and Uptown firehouses consists of two meals daily: one meal is prepared in-station and the second meal is brought from home by a select firefighter. Firefighters at these firehouses take care of their own lunches. Rondout Fire Station firefighters prepare three meals in-station daily. Rondout Building & Safety estimate that 60% of their refuse is food waste, consisting of coffee grinds, eggshells, and uneaten food from home or take-out.
    - Food Waste Disposal: Food disposal varies across the firehouses. Leftovers from in-station prepared food at Central Firehouse are generally taken home daily. Food that is not taken home is thrown out by the next shift. Uptown Firehouse firefighters will also take home in-station prepared food on a daily basis, but some shifts throw out food waste daily while others do not. Rondout Fire Station firefighters try to bring home food after every 24-hr shift, but do not throw out left-overs daily.

1.5. Attitudinal Notes

The overwhelming majority of municipal staff were in favor of participating in a food waste composting program. At City Hall, there was an openness to collecting food waste in table-top containers as long as the food waste was removed from the office space at the end of the day. The firehouses believed that implementation of food labeling system would be unlikely. Building & Safety staff are expressly interested in being able to compost animal products, like meat. Staff at all community centers were open to a food waste collection program, with a preference for a centralized collection location most common.

C. MUNICIPAL RECREATION FACILITIES

C.1. OVERVIEW

The City of Kingston offers recreation opportunities to City residents and visitors across the 24 distinct recreation facilities located in the City's 150 recreation acreage; these facilities appear in Table 4. Kingston Municipal Recreational Facilities. Of these facilities, the ten asterisked were not included in the waste sort; Table 6. Recreation Facility Amenities Excluded from Waste Sort notes why these facilities were excluded.

Table 4. Kingston Municipal Recreational Facilities

Academy Green Park	Fourth Ward Memorial Park *	Loughran Park
Andretta Pool	Greenline/Empire State Trail *	Midtown Linear Park *
Barmann / Metro Park	Hasbrouck Park & Stone Building	Peace Park *
Block Park	Hudson River Brickyard Trail *	Rickel Knox Park *
Clearwater Park *	Hutton Park	Rotary Park
Cornell Park *	Kingston Point Beach	Schultz Park *
Forsyth Nature Center	Kingston Point Park	TR Gallo Park Campus
Forsyth Park	Kingston Point Rail Trail *	Van Buren Park

The waste sort for the 14 non-asterisked facilities was conducted on Sunday, August 4, 2019; 98 waste bins were sorted. The sort was conducted by 12 persons, consisting of City of Kingston staff; volunteers from KCAC, CSKC, and Cornwall Central High School; and HVRC staff. Recreation Department laborers collected waste from the facilities, labeled bags by waste source location, and took the waste to the Forsyth Nature Center Horse Barn. The sort was completed outside the Barn during a five-hour period from 8:00am to 1:00pm. The outdoor temperature the week of the sort ranged from 93˚ to 82˚ Fahrenheit, with an average temperature of 87˚ Fahrenheit. On the day of the sort, the temperature reached 84˚ Fahrenheit by 12:00pm.

The sort was intended to capture one day's worth of waste to minimize putrefaction anticipated from the week's expected high temperatures. Only waste collected from Academy Green Park and Andretta Pool represented one week's worth of waste. Waste sort participants managed with grace sorting highly putrefied waste. Across the 98 waste bins, 44 bags of refuse (approximate) were collected and sorted as well as 1 bag containing recyclables; some bags included waste from multiple bins related by waste source location.

Environmental Educator and Recreation Leader KC Keegan-Twombly conducted a walk-through of the 14 facilities in late August. Table 5. Recreation Facility Amenities notes the amenities found at each facility location, consisting of presence of toilets; count of pavilions, gazebos, or other structures (13); number of refuse and recycling cans (98); presence of playing fields (29), such as playgrounds, ballfields, basketball courts, and pickleball / tennis courts; number of dog parks (1); the availability of onsite parking (8); and the location of waste cans as well as the public access to recreation facility structures. The facilities excluded from the waste sort, listed in Table 5, were excluded due to lack of amenities or waste containers.

Table 5. Recreation Facility Amenities

Location	Toilets	Pavilions & Similar	Refuse Cans	Recycling Cans	Playgrounds	Ballfield	Basketball	Pickle / Tennis Ball	Dog Parks	Onsite Parking	Notes
Academy Green Park	no		3							no	Albany Avenue bus stop near park. Some household garbage, dog waste, clothing.
Andretta Pool	yes		6							yes	Building, pool, pool patio included in waste sort. Uncovered picnic area with 4 tables within a fenced area. Joint parking with Dietz Stadium.
Barmann/Metro Park	no		2		1	1	1			no	Total cans: 2+. 1 for ball park, 1 for playground, 1 dumpster next to softball field collected by Knothole Little League.
Block Park	yes	1	11		1	1	1			yes	Total cans: 11. 2 for Pavilion, 1 at basketball, 2 at soft ball, 6 for soft ball/parking area. Park heavily used for softball. Pavilion open to general public.
Forsyth Nature Center (including Gazebo)	yes	1	4	2						yes	4 trash cans + 2 recycling cans: 3 trash bins, 2 of which are paired with recycling bins, 1 trash can in gazebo. Gazebo open only to renters for parties.
Forsyth Park (including Pavilion)	yes	1	6		1	1		4		yes	Total cans: 6. 2 for Pavilion, 1 outside composting toilet, 1 at tennis courts, 1 at Kinderland, 1 at end of ball field. Pavilion open to general public.
Hasbrouck Park (including Pavilion & Stone House)	yes	2	10		1	1	1			yes	Total cans: 10. 2 for Pavilion, 1 for softball field, 1 at bottom of woods, 1 at Playground (for general Park use, basketball court, and school because school uses playground on daily basis), 5 for Stone House (3 are inside and only accessible to House renters). Pavilion open to general public.
Hutton Park (including Pavilion)	yes	1	5		1	1		2		no	Total cans: 5. 2 for Pavilion, 2 for soft ball field, 1 for Playground and general Park use. Not a league-used field, just pick-up games, traffic is not high. Pavilion open to general public.
Kingston Point Beach (including Pavilion)	yes	1	7		1					yes	Total cans: 7. 2 for Kingston Point Beach Pavilion, 1 near playground, 4 for parking. Pavilion open to the general public.
Kingston Point & Rotary Parks (Rotary: including Pavilions & Gazebo)	yes	4	20			1			2	yes	Total cans: 20. Kingston Point Park: 3 at parking lot, 3 at bathrooms, 3 at softball field, 3 for big dog park, 2 for little dog park. Rotary Park: 3 at pavilion, 3 for 3 gazebos. Pavilions/gazebos open to general public; pavilion is rented. BMX site.
Loughran Park (including Pavilion)	yes	1	10		1	1	1	4		yes	Total cans: 10. 2 for Pavilion, 4 for baseball, 1 for pickleball, 1 near old bathrooms for basketball, 2 for parking lot. Pavilion open to general public.
TR Gallo Park Campus	yes		11							no	Total cans: 11. 7 for Promenade & docks, 1 for parking lot, 1 for plaza, 1 for general park area, 1 for bathroom.
Van Buren Park (including Gazebo)	no	1	1		1					no	1 trash can associated with small pocket park/playground and small gazebo. Gazebo open to general public.
Totals:	**10**	**13**	**96**	**2**	**8**	**7**	**4**	**10**	**2**	**8**	

Acreage All Parks: 150 98 Waste Bins

Table 6. Recreation Facility Amenities Excluded from Waste Sort

Recreation Facilities Excluded from Waste Sort	
Location	**Notes**
Clearwater Park	Woods with no amenities. No longer actively managed by City.
Cornell Park	No amenities; no trash cans.
Fourth Ward Memorial Park	No amenities; no trash cans; very small, by side of road, rarely frequented.
Greenline/Empire State Trail	No amenities; carry-in/carry-out.
Hudson River Brickyard Trail	No amenities; carry-in/carry-out.
Kingston Point Rail Trail	Three parklets with one refuse and recycling can each.
Midtown Linear Park	No amenities; carry-in/carry-out.
Peace Park	Extremely small, only 1 bench.
Rickel Knox Park	Being renovated; waste generation anticipated to be very small; only 1 waste bin.
Schultz Park	Owned by Kingston, but managed by little league, which uses all of property.

**Table is accurate for the time of the waste sort. Certain recreation facilities listed above now have trash and recycling.*

The balance of "Municipal Recreation Facilities" provides an overview of the waste audit and facility walk-throughs completed for the referenced municipal recreation facilities. It begins with highlights from the audit and walk-through and is followed by a brief explanation of the waste sort process, photographs of the waste sort, and detailed findings from each facility. Recreation facility use provided on rental applications was analyzed as well to provide a basis for the development of annualized waste estimates produced by the City's recreation facilities. Annualized waste estimations are provided based on three use types identified as well as their combined totals; an analysis of recreation facilities' waste based on weigh slips for 2019 is also provided. The waste audit findings include sections from each waste sort report. The complete facility walk-through reports are found in Appendix B. Waste Assessments in this Study's Appendices.

C.2. RECOMMENDATIONS FROM RECREATION FACILITIES WASTE ASSESSMENTS

- **The City should align its various application process practices, from streamlining the intake process to the applications used.** The City's application process for recreation facilities and events is decentralized. For events, depending on the event size or past relationships, applications may be reviewed and approved by the Parks & Rec Superintendent, Parks & Rec Clerk, Special Events Coordinator, or a recreation facility's caretaker. Non-event related recreation facility applications are received by paper, completed online via ActiveNet with and without Kingston staff support, and completed by paper by staff on behalf of applicants. Aligning the application process will allow for another consistent point of education and outreach for a food waste collection program. Application(s) should be updated to include an organics diversion section with hyperlinks to guidance documents for food waste collection in the respective settings.
- **Expand use of a recreation facility management platform for all City-hosted and -supported events and recreation facility rentals.** The City currently uses ActiveNet, an events management platform, for some events and most recreation facility rentals, but it is used inconsistently. Uniform use of a single events management platform for rentals and events by all City staff will allow for greater coordination amongst all departments involved. The events management should include food waste and recycling education and outreach prompts for staff as well as the general public.

- **Determine the appropriate number and location of waste cans for recreation facilities, taking all waste streams to be collected into account.** The facility walk-through by and large revealed an appropriate placement of refuse cans at Kington outdoor recreation facilities, although most locations did not include recycling cans and Dietz Stadium Parking area and Kingston Farmers Market appeared to have fewer than needed cans. Placement of recycling cans alongside refuse cans was inconsistent in indoor recreation facilities. A standard best practice is tandem placement to increase diversion of recyclables. For those locations where a three-bin system will be instituted, the bins should be placed right next to each other.

C.3. WASTE AUDIT AND FACILITY WALK-THROUGHS – HIGHLIGHTS

Recommendations resulting from the analysis of waste sort and facility walk-throughs for the City's recreation facilities are found in this Study. Highlights from the analysis of applications submitted (2016-2019) for Parks & Rec-managed recreation facilities, waste sort reports for the recreation facilities analyzed, and facility walk-throughs for these facilities follows.

1. APPLICATION ANALYSIS HIGHLIGHTS

- Kingston's recreation facilities are known to experience a high level of use. Over the four-year period analyzed from 2016 – 2019, a total of 815 applications were received by Parks & Rec, representing 73,392 reported attendees. With the exception of a few recreation facilities that are only available as rentals, the facilities analyzed experience additional use as they are available to the general public year-round.
- The overwhelming majority of applications, 77.18%, were received for rentals indicating that they would have 50 attendees or less, with the most submitted for events with 26-50 people. This data correlates with application submissions for personal events (birthday or retirement parties, etc.), which constituted 72.27% of all applications received and represented 24,910 reported attendees. Although applications related to large events comprised just over a quarter of all applications, large events applications represented 48,305 reported attendees.
- The most frequently used recreation facilities were, in order of most applications, Hasbrouck Park Stone Building, Forsyth Park Pavilion, and Kingston Point Beach. A more detailed analysis revealed that Hutton Park Pavilion was also popular with applicants indicating 50 attendees or less; and Kingston Point/Rotary Park was also popular with applicants indicating 51 attendees and over as well as with large entity applicants requesting use in association with large events. When viewed from the perspective of attendee count, however, Forsyth Park Pavilion, Hasbrouck Park Stone Buildling, and Loughran Park Pavilion received applications representing two-thirds of all reported attendees.
- Of the 815 submitted applications, only 23 applicants paid the $100 for refuse removal, resulting in $2,300 in fee collection over the four-year period analyzed. The overwhelming majority of applicants that do not pay for refuse removal do an effective job of carrying out waste after rental completion; Hasbrouck Park Stone Building experiences the least carry-out compliance of all rental facility structures. Staff estimations of the number of applicants paying for refuse removal and the annual fees collected were both lower than the actuals revealed by the analysis. Addressing the carry-in/carry-out policy with non-compliant applicants as well as implementing a refuse removal deposit system has been challenging.

- The application approval process is decentralized. Depending on the event size or past relationships, applications may be reviewed and approved by the Parks & Rec Superintendent, Parks & Rec Clerk, Special Events Coordinator, or a recreation facility's caretaker.

2. WASTE SORT REPORTS HIGHLIGHTS

The following highlights focus on the annualized waste estimations.

- On the day of the waste sort across the 18 recreation facilities analyzed, 1,187.25 pounds of waste was collected across the three waste streams (refuse, compostables, recyclables) and three use types (normal use, regular rental, large event). Refuse represented the largest portion of the waste stream at 56.33%, followed by compostables at 31.50%, and then recyclables at 12.17%.
- Annualizing the waste streams across the different use types resulted in an annual estimated waste production of 94,815.55 pounds, or 47.41 tons, of which 14.38 tons would be divertible (compostables and minimally contaminated recyclables). A review of Parks & Rec weigh slips available for 2019 revealed actual tonnages to total 49.18 tons for all waste streams, of which 14.92 tons were divertible.
- Annualization resulted in a different waste stream composition due to the different annualization methods applied to the different use types. Refuse again represented the largest portion of the waste stream, but projected at a higher proportion at 69.67%. Compostables were still the second largest portion of the waste stream, but also at a lower percentage at 16.30%. Only recyclables were projected to increase slightly to 14.03% of the waste stream.
- Table 7. Comparison of Annualized Pounds of Waste by Use Type shows the projected differences in waste production between the three use types across the different waste streams.

Table 7. Comparison of Annualized Pounds of Waste by Use Type

	Total Pounds Waste -- Annualized				Total Percentages -- Annualized		
	Refuse Pounds	Recyclables Pounds	Compostables Pounds	Total Pounds Waste	Refuse Pounds	Recyclables	Compostables
Normal Use Locations:	61,787.75	11,914.50	13,367.00	87,069.25	70.96%	13.68%	15.35%
Regular Rentals:	2,660.15	1,166.27	406.23	4,232.65	62.85%	27.55%	9.60%
Large Event Rentals:	1,607.16	223.78	1,682.72	3,513.66	45.74%	6.37%	47.89%
				94,815.55			

  - On an annualized basis, compostables represent the largest proportion of the waste stream for facilities rented in association with large events (47.89%), although the largest by weight was for facilities used as part of normal, daily activities (13,367.00 pounds).
  - Refuse represent the largest portion of the waste streams for facilities used as part of normal, daily activities (70.96%) as well as facilities rented for smaller events (62.85%).
- Annual estimated savings from improved recycling practices and institution of a composting program at the recreation facilities managed by Parks & Rec were $1,509.93 after annualizing the three waste streams. These annual estimated cost savings include additional savings that would be captured from minimally contaminated recyclables from Forsyth Nature Center, the only recreation facility with recycling cans at the time. The annualized refuse tipping fees are estimated to be $3,467.89.
- Table 8. Comparison of Annualized Pounds of Waste by Recreation Facility shows the projected differences in waste production for the 18 facilities analyzed. Use types are identified by NU for

facilities experiencing normal daily use with no application submission, RR for facilities rented for regular events like birthday parties, and LE for facilities rented for large events like the Drum & Bugle Corps.

Table 8. Comparison of Annualized Pounds of Waste by Recreation Facility

	Total Pounds Waste -- Annualized				Total Percentages -- Annualized		
	Refuse Pounds	Recyclables Pounds	Compostables Pounds	Total Pounds Waste	Refuse Pounds	Recyclables	Compostables
Academy Green (NU):	1,150.50	126.75	175.50	1,452.75	79.19%	8.72%	12.08%
Andretta Pool (NU):	92.25	38.25	85.50	216.00	42.71%	17.71%	39.58%
Barmann/Metro Park (NU):	4,914.00	341.25	0.00	5,255.25	93.51%	6.49%	0.00%
Block Park (NU):	3,753.75	1,228.50	136.50	5,118.75	73.33%	24.00%	2.67%
Forsyth Nature Center (NU):	1,898.75	488.25	596.75	2,983.75	63.64%	16.36%	20.00%
Forsyth Nature Center Gazebo (RR):	9.75	1.00	3.25	14.00	69.64%	7.14%	23.21%
Forsyth Park (NU):	5,138.25	682.50	429.00	6,249.75	82.22%	10.92%	6.86%
Forsyth Park Pavilion (LE):	84.25	13.75	82.50	180.50	46.68%	7.62%	45.71%
Hasbrouck Park (NU):	9,145.50	2,866.50	1,911.00	13,923.00	65.69%	20.59%	13.73%
Hasbrouck Park Pavilion (RR):	35.50	19.00	4.50	59.00	60.17%	32.20%	7.63%
Hasbrouck Park Stone House (RR):	5.50	2.25	0.00	7.75	70.97%	29.03%	0.00%
Hutton Park (NU):	5,118.75	1,501.50	3,207.75	9,828.00	52.08%	15.28%	32.64%
Kingston Point/Rotary Parks & Kingston Point Beach (LE):	48.75	4.75	59.50	113.00	43.14%	4.20%	52.65%
Loughran Park (NU):	4,641.00	1,774.50	4,777.50	11,193.00	41.46%	15.85%	42.68%
Loughran Park Pavilion (LE):	5.25	0.75	2.75	8.75	60.00%	8.57%	31.43%
TR Gallo Campus (NU):	25,047.75	2,525.25	2,047.50	29,620.50	84.56%	8.53%	6.91%
Van Buren Park (NU):	887.25	341.25	0.00	1,228.50	72.22%	27.78%	0.00%

- TR Gallo Campus's (NU) annualized waste stream would represent the largest by weight for all waste (29,620.50 pounds) as well as by weight for refuse (25,047.75 pounds). For recyclables, Hasbrouck Park (NU) would represent the largest by weight (2,866.50 pounds), followed by TR Gallo Campus (NU, 2,525.25 pounds) and Loughran Park (NU, 1,774.50 pounds). For compostables, Loughran Park (NU) would represent the largest by weight (4,777.50 pounds), followed by Hutton Park (NU, 3,207.75 pounds) and TR Gallo Campus (NU, 2,047.50 pounds).
- Compostables would represent the largest proportion of the waste stream at Kingston Point/Rotary Parks & Kingston Point Beach (LE, 52.65%), followed by Forsyth Park Pavilion (LE, 45.71%) and Loughran Park (NU, 42.68%).
- With the exception of Kingston Point/Rotary Parks & Kingston Point Beach (LE) and Loughran Park (NU), refuse would constitute the largest proportion of the waste stream across use types and locations.
- No compostables were found in the waste stream for Barmann/Metro Park (NU) and Van Buren Park (NU), both of which have the smallest number of on-site refuse cans. (Compostables may be thrown into the non-City dumpster located at the Barmann/Metro Park (NU) softball field.)
- Hasbrouck Park Pavilion (RR) would have the largest proportion of recyclables on an annualized basis (32.20%), followed by Hasbrouck Park Stone Buildling (RR, 29.03%) and Van Buren Park (NU, 27.78%).

3. FACILITY WALK-THROUGH HIGHLIGHTS

- At the time the facility walk-through was conducted, 98 waste cans were available for waste deposition throughout the 18 recreation facilities included in this analysis. While the number of waste cans differs slightly today, cans are generally placed in the high-traffic areas of each recreation facility. Structures, such as pavilions and gazebos, have a minimum of two waste

cans per structure. Fields and courts, such as ballfields and basketball courts, have a minimum of one waste can. Facilities with large parking areas have a number of waste cans; Kingston Point Park and Kingston Point Beach, for example, each had 3 cans.

- With the exception of Forsyth Nature Center, recycling cans were not paired with refuse cans at the time of the analysis. The contamination rate for the minimal amount of waste thrown into recycling bins (3.50 pounds) was 64.29%. Recyclables represented 9.76% of the waste thrown into the paired refuse bin (1.00 pound).
- Ms. Keegan-Twombly noted the presence of waste outside of waste bins at every park; litter is most commonly seen at the Hasbrouck Park Pavilion and at Kingston Point Beach.

D. EVENTS

D.1. OVERVIEW

The City hosts or supports hundreds of events annually held at City-owned properties, on City streets, or at private properties. For the purposes of this plan, hosted events are those that Kingston manages and for which it collects waste. Supported events are those for which the City collects waste; waste collection typically includes refuse and recycling or refuse alone. The events hosted or supported by the City include band competitions, car shows, sports games, festivals, parades with controlled food distribution areas, races (bike & road), rallies providing controlled food distribution areas as well as block parties, and film shootings. In addition to waste collection, the City often provides additional services, such as traffic management during events, public transit, and police presence.

Waste sorts were conducted for four events: Fall Festival, Made in Kingston, March of Champions Drum & Bugle Corps, and Kingston Farmers Market. Information on the waste sorts for these events follow. The balance of "Events" provides an overview of the waste audit and facility walk-throughs completed and provides highlights from both. Photographs of the waste sort and detailed findings from each event are located in City Of Kingston Organics Diversion Study – Appendices. The waste audit findings include sections from each waste sort report.

D.1.1. FALL FESTIVAL

Fall Festival is a City-hosted, single-day event held annually at the Forsyth Nature Center. It is a medium-sized event with approximate attendance of 1,677 persons held in a small area with only 6 waste locations. Food vendors are concentrated in one to three areas, with three food vendors present at the event analyzed in this study. The City typically collects both refuse and recycling for this event. Parks & Rec is the primary point of contact and planner. Applications are submitted for this event, both an Event/Parade application and vendor applications.

For this event evaluation, the City instituted an unmanned, three-bin waste collection system, with each waste receptacle clearly labeled for refuse, compostables, and recyclables (see Appendix B. Waste Assessment, "Events" section, Waste Sort Photographs). This was an excellent opportunity to compare an unmanned process with a fully manned process instituted at the Made in Kingston event. The waste sort was conducted on Sunday, October 7, 2018, at the Forsyth Nature Center Horse Barn on a 75˚F day at the end of the Festival at 5:00pm. Waste sort volunteers included Casey Schwarz from the CSKC, Sustainability Coordinator Julie Noble and Environmental Educator KC Keegan Twombly from the City of Kingston, Turner Warren from Cornwall Central High School, and Europa McGovern and Carla Castillo from HVRC.

D.1.2. MADE IN KINGSTON

Made in Kingston is a City-supported, single-day event held annually at different locations. It is a medium-sized event with approximate attendance of 1,067 persons held in a small, controlled interior space. Food vendors are concentrated in one to three areas, with six food vendors present at the event analyzed. The City only collects recycling. The City's Special Events Coordinator is the primary point of contact and the event is planned by the Business Alliance of Kingston. An Event/Parade application is submitted for this event, but not a vendor application as this event is held on private property.

A fully manned, three-bin waste collection system was employed by Zero To Go at this event, a former Mid-Hudson composting business, held on Thursday December 6, 2018, at The Metro, an indoor, unheated space. The waste collection services for this event totaled $750, less than the normal Zero To Go fee for such an event due to the different staffing approach negotiated by the event planners. Zero To Go's fees typically include a staff member at each waste collection station. Kingston negotiated the participation of City staff and volunteer to manage the stations, resulting in three waste stations each managed by two persons, called Compost Guides. Six City staff and CSKC members served as Compost Guides assisting event patrons with proper disposal of waste. Zero to Go trained the Compost Guides for 15 minutes on the day of the event. Two paid Zero To Go staff were present throughout the event providing additional support; they also emptied collected waste into a truck, manually removing any contaminants from the composting and recyclables waste stream. Compost Guides included Maija Niemisto, Sarina Pepper, Karen Sullivan, and the late John Wackman from the CSKC as well as Sustainability Coordinator Julie Noble, Environmental Educator KC Keegan Twombly, and former Environmental Specialist Sean Koester from the City of Kingston.

In advance of the event, all food vendors received information about opting into the provision of compostable food ware during the event. It was not presented as a requirement. Specific packaging and serving ideas were provided. On the day of the event, Zero To Go staff conducted a brief meeting with vendors. Zero To Go staff also went to each station at set-up, reviewed vendor supplies for the day, and reviewed with vendors which food ware was compostable / recyclable. All vendors were asked to place their waste receptables behind their stations so that they were not used by the general public.

D.1.3. MARCH OF CHAMPIONS DRUM & BUGLE CORPS

March of Champions Drum & Bugle Corps is a City-supported, single-day event held annually at Dietz Stadium Campus, a municipal recreation facility. It is a medium-sized event with an approximate attendance of 1,633 persons held in a large outdoor area that includes a large parking area as well. A single food vendor is located at the Dietz Stadium concession stand. The City only collects refuse. The City's Special Events Coordinator and Parks & Rec are the primary points of contact and the event is planned by the Children's Home of Kingston. An Event/Parade application is submitted for this event, but not a vendor application as the concession vendor was contracted annually at the time by the City.

The waste sort for this event was conducted on Sunday, August 4, 2019, on the same day as the waste sort for municipal recreation facilities and the Kingston Farmers Market. The waste sort was conducted at the Forsyth Nature Center Horse Barn from 8:00am-1:00pm on a day when the

temperature ranged from 65˚F -74˚F. Due to the rain on the day of the event on Saturday, attendance was lower at an estimated 1,000 persons. Volunteers sorted waste from both the Stadium Campus and parking area, and included Emilie Hauser, Sarina Pepper, Casey Schwarz, and the late John Wackman from the Kingston Climate Smart Commission; Mayor Steve Noble, Sustainability Coordinator Julie Noble, Environmental Educator KC Keegan Twombly, and former Environmental Specialist Sean Koester from the City of Kingston; Councilperson Sarah Salem from the City of Poughkeepsie; Turner Warren from Cornwall Central High School; and Europa McGovern and Carla Castillo from HVRC.

D.1.4. KINGSTON FARMERS MARKET

The Kingston Farmers Market is a City-supported event held 40 times a year on Wall Street in Uptown Kingston. It is a medium-sized event with approximate attendance of 1,500 persons, now held in a large parking lot. The Farmers Market has approximately 42 vendors that are selected by the Farmers Market Committee. The City only collects refuse. The City's Special Events Coordinator is the primary point of contact. No application is provided. The City also supports a second weekly farmers market in Downtown Kingston, the Kingston Waterfront Farmers Market, with the same recurrence annually.

The waste sort for this event also was conducted on Sunday, August 4, 2019, on the same day as the waste sort for municipal recreation facilities and the March of Champions Drum & Bugle Corps. The waste sort location and temperature information are provided in the prior section. Volunteer waste sorters included Sarina Pepper and the late John Wackman from the Kingston Climate Smart Commission, Turner Warren from Cornwall Central High School, and Europa McGovern and Carla Castillo from the HVRC.

D.2. RECOMMENDATIONS FROM EVENTS WASTE ASSESSMENTS

- **Events using three- or four-bin waste collection stations must use volunteers to produce uncontaminated waste streams.** The clearly labeled unmanned waste stations were insufficient to reduce contamination, pointing to the importance of incorporating an educational/outreach component for reduced contamination. Liquids in recyclable bottles were a significant presence in the events waste sorts; a fourth collection bin for liquids would be needed to reduce the weight of recyclables. Even with volunteers available to provide event attendees with proper waste disposal guidance, it may still be necessary to employ persons to physically remove contaminants to reach zero contamination, as was seen with the Made in Kingston event.
- **Frequent and regularly recurring updates on permitted divertible items for recycling and organics diversion programs must be provided to staff and participating constituents to reduce contaminants in both waste streams.** With the recycling commodities market frequently in flux, permitted recyclables will change. UCRRA must ensure that its notification processes to municipalities is frequent and clear to reduce undue contamination fees. Holding frequent and regular recurring meetings provide the opportunity to update on permitted divertible items as well as identify challenges being encountered and troubleshoot solutions. During a couple of the events waste sorts, the recycling of cardboard covered in tape or printed with high-gloss ink revealed that laborers had not known of the new UCRRA requirements related to cardboard.

- **Events serving ware must be clearly identifiable as compostable for event attendees.** Events waste sorts with unmanned, three-bin waste stations with signage revealed attendees' commitment to compost seemingly compostable paper serving ware. The development of a Vendors' Waste Management Guide that includes approvable compostable serving ware would be very effective in supporting vendors in meeting this requirement. A discussion of the broad availability of these products are discussed in this Study in "Compostable Product Options"; it is important to note that any identification of truly compostable products must start with the Biodegradable Products Institute[99] (BPI).

D.3. WASTE AUDIT AND FACILITY WALK-THROUGHS – HIGHLIGHTS

Highlights from the analysis of waste sort and facility walk-throughs for City events follow and are associated with the following two Figures.

- The most total waste was produced by Fall Festival (557.00 pounds), followed by the Drum & Bugle Corps (385.75 pounds), as can be seen in Figure 4. Summary of All Event Waste Collected. Refuse was the largest portion of the waste stream across all events when assessed as a single-day event, with the exception of Made in Kingston. Recyclables were the second largest with the exception of the Kingston Farmers Market where compostables were highest. The most compostables were produced by the Fall Festival (178.25 pounds).

Figure 5. Summary of All Event Waste Collected. The vertical axis represents pounds collected.

[99] BPI, https://bpiworld.org/. Accessed March 28, 2023.

- The Drum & Bugle Corps event produced the most pounds of total waste per attendee (0.39 pounds/attendee) as well as the most refuse (0.15 pounds/attendee), as seen in Figure 5. Pounds Waste Collected Per Attendee. Fall Festival followed with the second most pounds of total waste (0.33 pounds/attendee) as well as the most recyclables (0.13 pounds/attendee). The Drum & Bugle Corps produced the most food waste per person (0.11 pounds/attendee). The average pounds of waste per attendee across all events was 0.0722 pounds/attendee for compostables, 0.0705 pounds/attendee of recyclables, and 0.939 pounds/attendee for refuse.

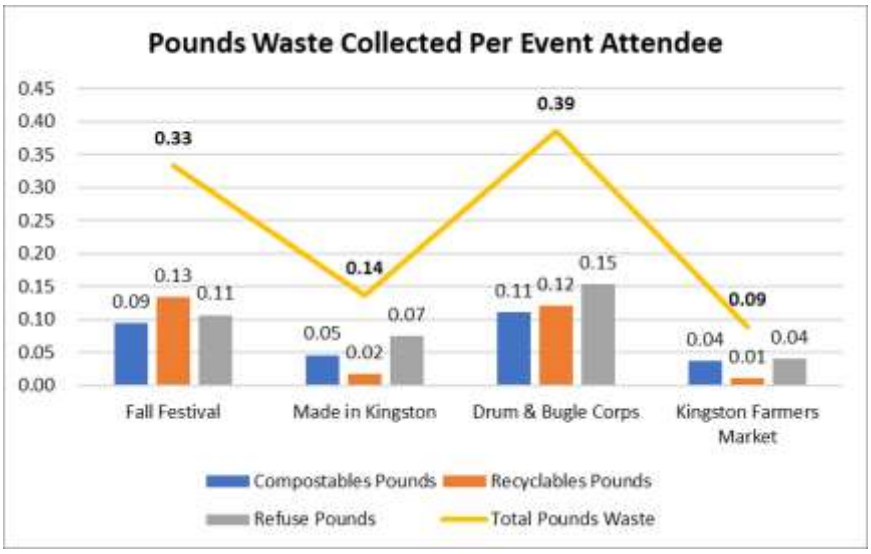


Figure 5. Pounds Waste Collected Per Attendee. The vertical axis represents pounds collected.

- Only manned three-bin waste collection stations were successful in producing uncontaminated waste streams. The clearly labeled unmanned waste stations were insufficient to reduce contamination, pointing to the importance of incorporating an educational/outreach component for reduced contamination.
- Liquids in recyclable bottles were a significant presence. The application of significant amounts of tape to cardboard prevented its recycling and would prevent its use in composting.
- Most attendees will assume that paper serving ware, such as nacho trays, are compostable.
- Even with waste station guides available to provide attendees with proper waste disposal guidance, paid staff still had to physically remove some contaminants thrown into each waste stream to reach zero contamination at the Made in Kingston event.
- Events held at the Dietz Stadium Complex, consisting of the Campus and Parking Area previously had access to only a single food vendor. Presently, food trucks are also available for events. The Campus has the largest number of refuse containers of all recreation facilities and no refuse containers in the Parking Area.[100]
- By comparison, the Kingston Farmers Market typically has a large number of visitors with only one refuse can available.
- Parks & Rec laborers had not been aware that cardboard printed with high gloss ink was no longer accepted by UCRRA.

[100] The stadium is currently undergoing a multi-million dollar renovation that is expected to result in changes to food distribution and waste collection practices.

3. FOOD WASTE ESTIMATES

A. MUNICIPAL ESTIMATE

A.1. BACKGROUND

The City of Kingston's municipal solid waste (MSW) was analyzed to determine the divertible food waste component of the total waste stream. Literature was reviewed to identify the available conversion factors for calculating the food waste component. Waste sorts conducted as part of this project provided additional metrics that were used to update the available conversion factors; an analysis of the waste sort data is found in Appendix B. Waste Assessments. The conversion factors were applied to Kingston MSW tonnages available for years 2014 thru 2019. This section explains the analysis conducted to arrive at the average annual estimated food waste production of 3,967.07 tons for all Kingston residents, 3,493.57 tons for Kingston residents receiving City collection, 958.14 tons for food waste producing businesses collected by the City, and 121.50 tons for government buildings and events.

A.2. OVERVIEW

The residential, commercial, and government food waste component of the City's MSW stream was estimated at the tonnages noted in the following two tables. The development of the residential, commercial, and government diversion rates is discussed in Appendix C. Food Waste Estimates, "Municipal Food Waste Collection Estimate".

Table 9. Estimated Food Waste of Kingston's MSW Stream, All Residences below provides the combined annual average of food waste produced by all Kingston residences, food waste producing businesses collected by the City, and government, estimated at 3,967.07 tons. The combined diversion rate, calculated at 40.07%, includes the rates developed for residential diversion for all Kingston residences, 29.16%, small commercial businesses, 9.68%, and government diversion, 1.23%.

Table 9. Estimated Food Waste of Kingston's MSW Stream, All Residences

40.07% Combined Diversion Rate | 29.16% Residential Diversion Rate, Total Kingston Population | 9.68% Commercial Diversion Rate | 1.23% Municipal Diversion Rate

Tonnages

	Month												Annual
Year	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
2014	313.98	248.92	276.86	318.79	334.25	313.19	374.65	293.38	342.01	328.76	284.37	341.39	**3,770.53**
2015	288.84	259.83	311.24	381.70	317.00	383.51	371.82	322.89	357.95	346.77	319.46	370.55	**4,031.56**
2016	288.23	282.14	300.56	294.16	324.07	374.39	316.26	346.00	328.56	319.12	350.29	320.89	**3,844.67**
2017	314.27	266.19	289.45	315.47	366.93	362.37	334.21	353.70	320.53	345.59	345.27	287.43	**3,901.41**
2018	314.09	276.00	285.29	314.14	361.98	317.16	383.78	388.08	356.31	422.28	368.46	332.80	**4,120.37**
2019	345.25	295.23	311.99	360.07	385.79	331.15	396.22	353.37	339.86	366.38	310.36	338.15	**4,133.86**
TOTAL	**1,864.67**	**1,628.31**	**1,775.40**	**1,984.34**	**2,090.02**	**2,081.76**	**2,176.94**	**2,057.41**	**2,045.23**	**2,128.91**	**1,978.20**	**1,991.22**	**23,802.40**
									Month Average	330.59		**Annual Average**	3,967.07
												Annual Maximum	4,133.86

Table 10. Estimated Food Waste of Kingston's MSW Stream, City-Collected Residences below provides the combined food waste produced by residences, commercial businesses, and government, for residences collected by the City's DPW, estimated at 3,493.57 tons. The combined diversion rate, calculated at 35.29%, includes the rates developed for City-collected residential diversion, 24.38%, commercial diversion, 9.68%, and government diversion, 1.23%.

Table 10. Estimated Food Waste of Kingston's MSW Stream, City-Collected Residences

35.29% Combined Diversion Rate	24.38% Residential Diversion Rate, Population Receiving City-Collection	9.68% Commercial Diversion Rate
	1.23% Municipal Diversion Rate	

Tonnages

	Month												Annual
Year	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2014	276.50	219.21	243.82	280.74	294.35	275.81	329.93	258.36	301.19	289.52	250.43	300.64	**3,320.49**
2015	254.36	228.82	274.09	336.14	279.17	337.73	327.44	284.35	315.23	305.38	281.33	326.32	**3,550.36**
2016	253.82	248.46	264.68	259.05	285.39	329.70	278.51	304.70	289.34	281.03	308.48	282.59	**3,385.78**
2017	276.76	234.42	254.90	277.82	323.13	319.11	294.32	311.48	282.28	304.34	304.06	253.13	**3,435.75**
2018	276.60	243.06	251.24	276.64	318.77	279.30	337.97	341.76	313.78	371.88	324.48	293.08	**3,628.57**
2019	304.05	259.99	274.75	317.10	339.74	291.63	348.93	311.19	299.30	322.65	273.32	297.79	**3,640.45**
TOTAL	**1,642.11**	**1,433.95**	**1,563.49**	**1,747.49**	**1,840.56**	**1,833.29**	**1,917.10**	**1,811.84**	**1,801.11**	**1,874.81**	**1,742.09**	**1,753.55**	**20,961.40**
									Month Average	291.13		**Annual Average**	3,493.57
												Annual Maximum	3,640.45

This Study developed a conservative estimate for municipal food waste collection. Per Table 11. Estimated Food Waste Collected from Kingston MSW for a City-wide Curbside Collection Program below, at an estimated collection rate of 16.51% for residential structures with four units or less, small food-producing businesses, and all government-related facilities and events, a conservative average of 1,634.91 tons annually are estimated to be collected. The balance of this section discusses the development of the estimated 16.51% collection rate.

Table 11. Estimated Food Waste Collected from Kingston MSW for a City-wide Curbside Collection Program

16.51% Estimate Collection Rate	24.38% Residential Diversion Rate	42.60% Residential Participation Ra	54.00% Residential Set-out Rate
	1.23% Municipal Diversion Rate	9.68% Commercial Diversion Rate	

Tonnages

	Month												Annual
Year	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2014	129.40	102.58	114.10	131.38	137.75	129.07	154.40	120.91	140.95	135.49	117.19	140.69	**1,553.92**
2015	119.04	107.08	128.27	157.31	130.64	158.05	153.24	133.07	147.52	142.91	131.65	152.71	**1,661.49**
2016	118.78	116.27	123.87	121.23	133.56	154.29	130.34	142.59	135.41	131.52	144.36	132.25	**1,584.47**
2017	129.52	109.70	119.29	130.01	151.22	149.34	137.73	145.77	132.10	142.43	142.29	118.46	**1,607.85**
2018	129.44	113.75	117.58	129.46	149.18	130.71	158.16	159.93	146.84	174.03	151.85	137.15	**1,698.09**
2019	142.29	121.67	128.58	148.39	158.99	136.48	163.29	145.63	140.06	150.99	127.91	139.36	**1,703.65**
TOTAL	**768.47**	**671.06**	**731.68**	**817.79**	**861.34**	**857.94**	**897.16**	**847.90**	**842.88**	**877.37**	**815.26**	**820.62**	**9,809.46**
					Monthly Maximum		174.03	**Month Average**		136.24		**Annual Average**	1,634.91

A.3. RECOMMENDATIONS FROM MUNICIPAL ESTIMATE

- **Determine if waste collection routes and schedules need to be modified.** A majority of residential food waste collection, and a significant portion of commercial food waste collection, is likely to be allocated to the Kingston DPW in lieu of private haulers given the current hauling practices in the City. Undertaking food waste hauling may require reconfiguration of existing DPW collection routes and schedules. This requires consideration of the frequency of food waste collection. Some municipalities (Renton, WA; Vancouver, WA; and Portland OR) incentivize food waste collection by scheduling solid waste pickup every other week and food waste pickup weekly;[101] other food waste collection practices are outlined in this Study's Appendices, Appendix H. Case Studies. Larger municipalities use GIS route optimization to ensure efficient collection and pickup times, reducing route collection times, distance traveled, and carbon emissions,[102] though this may not be necessary for a municipality the size of

[101] US EPA, REG 09. 2015, "Examples and Resources for Transforming Waste Streams in Communities (#1-50)", https://www.epa.gov/transforming-waste-tool/examples-and-resources-transforming-waste-streams-communities-1-50. Accessed December 20, 2021.

[102] Silva, Nipuni, and Janaki Sandamali, 2021, *Solid Waste Route Optimization Using GIS Techniques for Galle Municipal Council.*

Kingston. Additionally, collection routes for commercial establishments must be aligned with the amount of storage space available to commercial establishments as collected food waste should not become highly odorous or attract pests due to inopportune collection frequencies. For large generators and in summer months this may entail twice-weekly collection – a frequency that may be more appropriate for private haulers. There is the precedence of twice-weekly collection amongst Kingston Parks & Rec laborers in the warmer months. The City of Toronto found that automated trucks with bin liners were most appropriate for organics collection and claimed that they reduced repetitive movement injuries, given the heavier weight and higher compaction of organics in comparison to solid waste or recycling.[103]

- **Consider negotiating provision of the City's yard waste to the composting facility.** A six-year analysis of the City's yard waste revealed that Kingston averages an estimated 1,244.56 tons of yard waste annually. The City should consult with the selected composting facility to determine whether yard waste would be accepted with food waste. If comingling of yard and food waste is allowed, the composting facility should outline the acceptable form and types of yard waste.

A.4. KINGSTON MUNICIPAL SOLID WASTE

The US EPA Report on the Environment defines MSW, or trash or refuse, as "…everyday items such as product packaging, yard trimmings, furniture, clothing, bottles and cans, food, newspapers, appliances, electronics and batteries. Sources of MSW include residential waste (including waste from multi-family housing) and waste from commercial and institutional locations, such as businesses, schools and hospitals."[104] Many of these items are reusable, recyclable, or compostable. Municipal solid waste is collected by the City's DPW and Parks & Rec. City-collected MSW is taken to UCRRA in Kingston.

1. MSW COLLECTION PRACTICES

1.1. DPW Collection

Per the City's 2019 Recycling Tote Volume Evaluation report, Kingston DPW has a separate Sanitation Division that is overseen by a foreman, and includes a dispatcher and 23 full-time employees that collect the City's MSW in two teams – refuse and recycling. The refuse team has four drivers for four trucks, with six laborers. The recycling team has three drivers for three trucks, supported by four laborers.

The Sanitation Division collects MSW Monday thru Thursday from approximately 6,990 collection points (as of 2021), consisting of residential single-family homes, residential multi-family homes with four units or less, and a portion of small commercial businesses. Fridays are reserved for collection of yard waste, trees, additional metal recycling and refuse collection; laborers also address mowing and trimming needs across municipal properties. MSW is collected weekly on differing schedules based on the type of waste stream. Additional waste collected by the Sanitation Division that is not pertinent to this Study is outlined in City of Kingston DPW – Refuse/Recycling Information Calendar 2022[105].

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[103] Lori Lovely, "Collection Containers for Organic Waste," 2018, *MSW Management*. https://www.mswmanagement.com/collection/carts-bins/article/13032886/collection-containers-for-organic-waste Accessed December 20, 2021.

[104] "Report on the Environment", US EPA, https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=53. Accessed May 13, 2022. The EPA "…definition of MSW does not include industrial, hazardous or construction and demolition (C&D) waste."

[105] "Refuse/Recycling Information Calendar 2022", City of Kingston Department of Public Works, https://kingston-ny.gov/filestorage/8399/8469/10411/2022_Calendar_Refuse-Recycling.pdf.

- Refuse is collected weekly.
- Recycling is also collected weekly, but on a bi-weekly schedule based on the type of recyclable, shown in Figure 6. City of Kingston Department of Public Works Refuse/Recycling Information Calendar 2022. Glass, plastic, and metal are collected on blue-shaded weeks; paper and cardboard are collected on yellow-shaded weeks.
- Yard waste, trees, leaves, and brush are collected on differing schedules. Yard waste and brush are collected on Fridays mid-April to early October depending on refuse collection day: Monday/Tuesday refuse collection days have yard waste and brush collected on blue-shaded Fridays; Wednesday/Thursday refuse collection days have yard waste and brush collected on yellow-shaded Fridays. Leaves are collected mid-October to early December according to the below schedule. There is additional collection for Christmas trees in January. These collection periods cited vary slightly year to year based on a specific year's calendar.

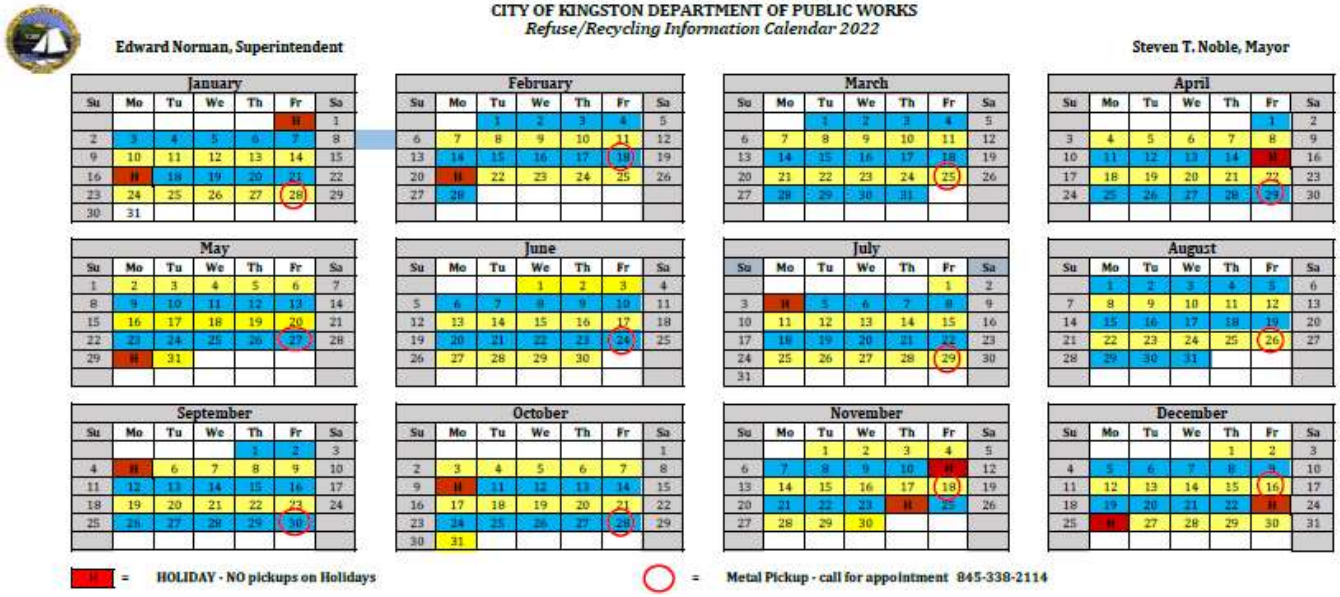


Figure 6. City of Kingston Department of Public Works Refuse/Recycling Information Calendar 2022

The 6,990 MSW residential and commercial collection, or location, points by day are shown below in Table 12. DPW Residential and Commercial Collection Points and in Figure 7. DPW Tote Schedule. The Tuesday run, shown in red in Figure 7, contains the majority of small commercial business waste collected by the City. Wednesday has the largest collection points at 1,815 locations collected. Table 13. DPW Collection Points of Food Waste Producing Businesses shows the estimated percentage and number of food waste producing businesses by day. The percentages were provided by the City's Sustainability Coordinator.

Table 12. DPW Residential and Commercial Collection Points

Day	Residential	Commercial	Points by Day
Monday	1,664	56	**1,720**
Tuesday	1,519	188	**1,707**
Wednesday	1,754	61	**1,815**
Thursday	1,712	36	**1,748**
Points by Type:	**6,649**	**341**	**6,990**

Table 13. DPW Collection Points of Food Waste Producing Businesses

	Food Businesses		
Day	Commercial	Percentage	Number
Monday	56	7.00%	**4**
Tuesday	188	29.00%	**55**
Wednesday	61	8.00%	**5**
Thursday	36	19.00%	**7**
Points:	**341**		**71**

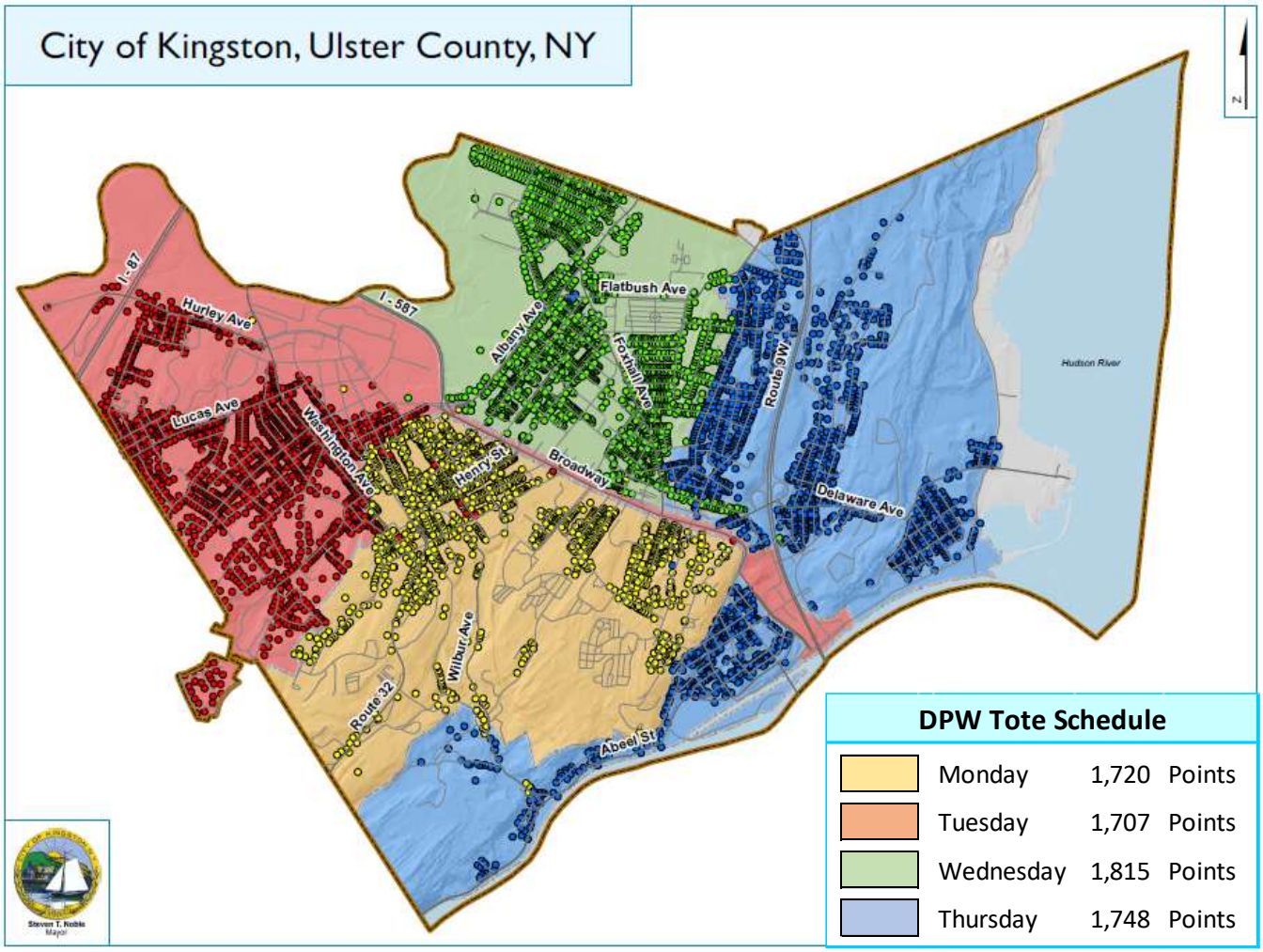


Figure 7. DPW Tote Schedule as of 2021. Each dot represents a single collection point.

1.2. Parks & Rec Collection

Parks & Rec laborers collect waste from the 24 distinct recreation facilities located in the City's 150 recreation acreage. Laborers use five, one-ton dump trunks at differing collecting frequencies. Each dump truck has one or two laborers assigned to a truck. During the peak summer months, each laborer is responsible for one to two parks. Collection frequencies are higher during the warmer months than during late fall and winter. Waste is either taken to either UCRRA for disposal at the end of most collection days or to the City of Kingston Transfer Station.

2. MSW TONNAGES COLLECTED

The City tracks MSW collected through annual tonnage reports. Weigh slips are provided by UCRRA for refuse and recycling, which are then incorporated into tonnage reports by DPW and Parks & Rec clerks. DPW provided tonnage reports for the calendar years from 2014 thru 2019 for this Study. Parks & Rec tonnage reports were only available for 2019 as UCRRA weigh slips are not typically tabulated annually. Prior to July 2018, yard waste was taken to UCRRA. Weigh slips were available for the period from May 2017 thru June 2018. Table 17. Kingston Estimated MSW Tonnages Calculated for 2014-2019 provides actual and estimate tonnages for three MSW waste streams. A more detailed explanation of the data compiled is provided in the following sections.

2.1. Refuse & Recycling Tonnages

The tonnage reports for refuse and recycling are compiled by month. Totals were calculated for each year analyzed and then averaged across the five years to arrive at the annual average of 7,760.97 tons for refuse and 1,834.75 tons for recycling. The annual details for refuse and recyclables for the years analyzed are shown in Table 14. Kingston Refuse Tonnages Reported 2014-2019 and Table 15. Kingston Recycling Tonnages Reported 2014-2019. The month with the greatest average tonnage of refuse produced was July2015. For recycling, the month with the greatest average tonnage produced was June2017.

Table 14. Kingston Refuse Tonnages Reported 2014-2019

REFUSE DISPOSED													
Tonnages													
	Month												
Year	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2014	599.42	512.94	559.68	681.36	695.96	644.99	746.98	589.42	723.45	687.11	567.18	676.62	**7,685.11**
2015	567.44	545.74	634.14	820.48	638.32	732.62	735.00	664.34	738.57	668.19	631.74	702.70	**8,079.28**
2016	564.31	565.65	636.51	585.07	638.36	730.44	625.37	713.35	660.94	626.57	676.12	607.90	**7,630.59**
2017	622.17	520.74	596.79	620.27	715.92	710.21	671.57	729.33	647.93	678.01	674.68	557.79	**7,745.41**
2018	631.83	541.33	581.86	635.08	744.40	646.04	715.65	726.90	650.03	756.71	658.71	610.87	**7,899.41**
2019	632.11	535.04	570.91	650.92	705.53	604.68	714.77	650.15	621.01	675.02	563.37	602.49	**7,526.00**
TOTAL	**3,617.28**	**3,221.44**	**3,579.89**	**3,993.18**	**4,138.49**	**4,068.98**	**4,209.34**	**4,073.49**	**4,041.93**	**4,091.61**	**3,771.80**	**3,758.37**	**46,565.80**
												Annual Average	7,760.97
Month's Average	602.88	536.91	596.65	665.53	689.75	678.16	**701.56**	678.92	673.66	681.94	628.63	626.40	

Table 15. Kingston Recycling Tonnages Reported 2014-2019

RECYCLABLES COLLECTED													
Tonnages													
	Month												
Year	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2014	184.18	108.29	131.29	114.26	138.22	136.65	188.03	142.76	130.10	133.37	142.52	175.39	**1,725.06**
2015	153.42	102.72	142.63	132.13	152.83	224.50	192.96	141.50	154.77	197.26	165.53	222.08	**1,982.33**
2016	155.02	138.48	113.60	149.07	170.43	203.93	163.93	150.17	159.05	169.86	198.10	192.96	**1,964.60**
2017	162.17	143.59	125.60	167.06	199.83	194.15	162.51	153.40	152.03	184.49	187.01	159.56	**1,991.40**
2018	152.06	147.49	130.15	148.92	158.99	145.49	132.19	130.43	137.13	176.19	155.28	124.35	**1,738.67**
2019	130.62	117.18	118.34	144.55	146.75	126.90	160.56	130.51	129.81	134.39	122.28	144.55	**1,606.44**
TOTAL	**937.47**	**757.75**	**761.61**	**855.99**	**967.05**	**1,031.62**	**1,000.18**	**848.77**	**862.89**	**995.56**	**970.72**	**1,018.89**	**11,008.50**
												Annual Average	1,834.75
Month's Average	156.25	126.29	126.94	142.67	161.18	**171.94**	166.70	141.46	143.82	165.93	161.79	169.82	

2.2. Yard Waste Tonnages

Table 17. Kingston Estimated Yard Waste Tonnages Calculated for 2014-2019 shows the annual details of estimated tonnages for yard waste collected. Prior to July 2018, the City's yard waste was taken to UCRRA, with some processed by the City at its Transfer Station located at 1-31 Condie Street. Beginning July 2018, the City processed the majority of yard waste at its Transfer Station. As yard waste tonnages were only available for the equivalent of one year from May 2017 thru June 2018,

tonnages were calculated as a percentage of total MSW for this Study. The yard waste tonnage reports for this period provided tonnages specifically for the months of May, July, November, January, and February.

To arrive at the amount of yard waste as a percentage of total MSW collected, total yard waste for the one-year period, 1,407.68 tons, was divided by the MSW tonnage for 2017, 9,736.81 tons, resulting in 14.46%. A literature review provided additional proportions: The EPA's Advancing Sustainable Materials Management 2017 Fact Sheet[106] noted that yard trimmings accounted for 13.14% of total MSW in the United States; the NYS DEC 2010 Beyond Waste[107] report calculated that yard trimmings represented 11.30% of NYS MSW for suburban residential communities.[108] These three calculations were averaged to arrive at the yard waste collection proportion for the City: 12.97%.

Table 17. Kingston Estimated Yard Waste Tonnages Calculated for 2014-2019

12.97% : Collection Rate													
Tonnages													
	Month												Annual
Year	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
2014	101.63	80.57	89.62	103.19	108.19	101.38	121.27	94.96	110.71	106.42	92.05	110.51	**1,220.50**
2015	93.50	84.11	100.75	123.55	102.61	124.14	120.36	104.52	115.87	112.25	103.41	119.94	**1,304.99**
2016	93.30	91.33	97.29	95.22	104.90	121.19	102.37	112.00	106.35	103.30	113.39	103.87	**1,244.50**
2017	101.73	86.16	93.69	102.12	118.77	117.30	108.18	114.49	103.75	111.87	111.76	93.04	**1,262.86**
2018	101.67	89.34	92.35	101.68	117.17	102.66	109.96	111.20	102.09	121.00	105.57	95.36	**1,250.06**
2019	98.93	84.59	89.40	103.17	110.54	94.89	113.53	101.25	97.38	104.98	88.93	96.89	**1,184.48**
TOTAL	**590.75**	**516.10**	**563.09**	**628.94**	**662.19**	**661.55**	**675.67**	**638.42**	**636.16**	**659.81**	**615.10**	**619.61**	**7,467.39**
												Annual Average	1,244.56

2.3. MSW Tonnages

Table 17. Kingston Estimated MSW Tonnages Calculated for 2014-2019 shows the estimated MSW tonnages for refuse, recycling, and yard waste combined for the period analyzed. Annual average of total MSW tonnage for this period is 9,900.66 tons.

Tonnages from January 2014 thru June 2018 include actuals for refuse and recycling based on DPW-provided tonnage reports as well as yard waste. For this period, however, yard waste tonnages shown in Table 16 are understood to have been reported as part of the refuse tonnages because yard waste was taken to UCRRA. The tonnages shown represent 12.97% of total MSW.

Tonnages from July 2018 on also include actuals for refuse and recycling with the addition of the yard waste estimates, calculated at 12.97% of total MSW for this period, as yard waste was no longer taken to UCRRA and instead processed at the City's Transfer Station.

[106] "Advancing Sustainable Materials Management: 2017 Fact Sheet", US EPA, November 2019, https://www.epa.gov/sites/default/files/2019-11/documents/2017_facts_and_figures_fact_sheet_final.pdf.

[107] "Beyond Waste, Appendix H: Materials Composition and Characterization", NYS DEC, December 2010, https://www.dec.ny.gov/docs/materials_minerals_pdf/fbeyondwastegi.pdf. The Appendix classified communities with 325-5,000 persons per square mile as suburban residential communities.

[108] Per the Census Bureau Quick Facts, the City's 2020 population of 3,191.50 persons per square mile is based on the City's 2010 land area (United States Census Bureau, Quick Facts, Kingston City, New York, https://www.census.gov/quickfacts/kingstoncitynewyork. Accessed May 2022).

Table 17. Kingston Estimated MSW Tonnages Calculated for 2014-2019

MUNICIPAL SOLID WASTE DISPOSED													
Tonnages													
	Month												
Year	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2014	783.60	621.23	690.97	795.62	834.18	781.64	935.01	732.18	853.55	820.48	709.70	852.01	**9,410.17**
2015	720.86	648.46	776.77	952.61	791.15	957.12	927.96	805.84	893.34	865.45	797.27	924.78	**10,061.61**
2016	719.33	704.13	750.11	734.14	808.79	934.37	789.30	863.52	819.99	796.43	874.22	800.86	**9,595.19**
2017	784.34	664.33	722.39	787.33	915.75	904.36	834.08	882.73	799.96	862.50	861.69	717.35	**9,736.81**
2018	783.89	688.82	712.01	784.00	903.39	791.53	957.80	968.53	889.25	1,053.90	919.56	830.58	**10,283.26**
2019	861.66	736.81	778.65	898.64	962.82	826.47	988.86	881.91	848.20	914.39	774.58	843.93	**10,316.92**
TOTAL	**4,653.68**	**4,063.78**	**4,430.89**	**4,952.34**	**5,216.08**	**5,195.49**	**5,433.02**	**5,134.71**	**5,104.30**	**5,313.15**	**4,937.02**	**4,969.51**	**59,403.96**
												Annual Average	9,900.66

B. FOOD BUSINESS ESTIMATE

B.1. BACKGROUND

An analysis of commercial businesses was conducted to develop an estimate of food waste that could be diverted from the Kingston waste stream for a subset of Kingston commercial businesses. Businesses receiving curbside municipal refuse collection by Kingston DPW as well as those receiving private collection and those receiving both municipal and private collection were included in the listing, totaling 402 commercial businesses. Of this original listing, 188 commercial businesses produced food waste. Annual food waste tonnages were calculated based on available or developed food waste estimates for the subset of 127 food waste producing businesses receiving municipal and/or private refuse collection. Of this subset, 71 received municipal refuse collection.

B.2. OVERVIEW

Multiple sources were consulted to identify a list of food waste producing businesses from which to develop an estimate of tons of food waste disposed, and associated disposal cost. Multiple metrics were also researched to provide the largest possible options for developing conversion factors for food waste tonnage estimates. Multiple estimate options were used to develop a conservative food waste tonnage estimate; for example, state and federal estimates provided by the New York State Pollution Prevention Institute (NYS P2I) and US Environmental Protection Agency Excess Food Opportunities Map (EPA FOM) were averaged with local data when available, such as number of seats in an establishment or square footage.

The analysis of food waste producing businesses for which food waste estimates were available or developed revealed that businesses receiving refuse collection from private haulers, 56, represented the largest estimated annual tonnages, 1,316.72 tons, as shown in Table 18. Estimated Tons Annual Food Waste produced and Disposal Cost from Food Businesses. For these businesses, removing food waste from refuse collection would save businesses $144,839.20 from avoided tipping fees at $110/ton. For businesses that receive both City and private refuse collection, accounting for 71 businesses, avoided annual tipping fees savings to the City would total $106,395.40. Information on development of the food waste estimates for food businesses are available in this Study's Appendices, Appendix C. Food Waste Estimates.

Table 18. Estimated Tons Annual Food Waste Produced and Disposal Cost from Food Businesses

Estimated Tons Annual Food Waste Produced and Disposal Cost			
Collection	Estimated Tons/Year	Annual Disposal Cost	Business Count
City	850.47	$93,551.70	67
private	1,316.72	$144,839.20	56
both	107.67	$12,843.70	4
Total	**2,274.86**	**$250,234.60**	**127**

B.3. RECOMMENDATION FROM FOOD BUSINESS ESTIMATE

- **Include food waste collection from food waste-producing businesses along the City waste collection routes as a part of a municipal curbside food waste collection program.** The food waste estimation analysis conducted for this Study revealed that 71 businesses receiving both City and private refuse collection account for annual tipping fees expense to the City of approximately $100,604.70 based on an annual average estimated food waste production of 958.14 tons. Capturing even 50% of these tipping fees cost savings from a food waste collection program would be beneficial. It is recommended that food waste collection from food waste producing businesses be piloted by collection days, starting with collection days with the smaller number of businesses, to allow for programmatic adjustments for the larger collection days. The overwhelming majority of food waste producing businesses receiving City waste collection are full- and limited-service restaurants.

B.4. COMMERCIAL BUSINESSES

A list of commercial businesses operating in the City of Kingston was compiled from four sources: New York State Department of Health (NYS DOH), NYS P2I, EPA FOM, and City sanitation routes. This list was compiled to arrive at an estimate of food waste that could be diverted from the commercial business waste stream receiving curbside municipal refuse collection. The expectation is that businesses receiving municipal refuse collection would participate in a municipal curbside food waste collection program. Given the survey results discussed in "Stakeholder Feedback, Residential & Commercial", some businesses currently receiving private refuse collection may also opt into a municipal curbside food waste collection program.

1. COMMERCIAL BUSINESSES LIST SOURCES

Information on each of the sources for the commercial business lists is outlined below. All downloaded lists were reviewed further by Kingston Sustainability Coordinator Julie Noble, resulting in the removal of businesses known to be closed or outside of the City's municipal boundaries at the time of the study as well as the addition of information on businesses to be targeted as part of the Kingston Compost Survey effort.

- The New York State Department of Health (NYS DOH) listing, titled Food Service Establishment: Last Inspection, was downloaded in February 2019. This list is housed at HEALTH.DATA.NY.GOV and provides "the name and location of food service establishments and the violations that were found at the time of their last inspection" for permitted businesses.[109] The exported list includes facility names, addresses, date of last inspection, violations, number of critical

[109] "Food Service Establishment: Last Inspection", New York State Department of Health, https://health.data.ny.gov/Health/Food-Service-Establishment-Last-Inspection/cnih-y5dw. Accessed February 2019.

violations, date of permit expiration, permitted corporate business and owner names, and inspector comments.

- The New York State Pollution Prevention Institute (NYS P2I) listing was accessed in January 2020 through NYSP2I's Organic Resource Locator.[110] This mapper allows for the selection of various generator types, such as food service, food retail, and food or beverage manufacturing, by geographic location. The exported list includes facility names, facility types (e.g., Food Processors, Service & Hospitality), facility sub-type (e.g., Bakeries, Restaurant, winery), business address, estimated food waste in tons per week, the data source, and the food waste estimate methodology.
- The EPA FOM was accessed in June 2020.[111] The map shows the locations of almost 1.2 million possible food waste generators.[112] The *Excess Food Opportunities Map Version 2.1 – Technical Methodology* defines excess food as "food—whether processed, semi-processed, or raw—that is intended for human consumption but was removed from the supply chain and is managed in a variety of ways, such as donation to feed people, creation of animal feed, composting, anaerobic digestion, or sending to landfills or combustion facilities." The exported list provides business name and address, NAICS Code[113] description (e.g., Limited-Service Restaurants, Full-Services Restaurants), and low and high estimates of excess food.
- The Kingston DPW provided in March 2020 a listing of businesses receiving curbside municipal collection for refuse and/or recycling. The list includes business names and street addresses, types of waste collected (e.g., co-mingled recyclables, paper, refuse, cardboard), and business classes (e.g., AR for Art, NP for nonprofit, RS for Restaurant) by sanitation collection route (e.g., Monday thru Thursday runs).

2. OVERVIEW OF COMMERCIAL BUSINESSES ANALYZED

The list of commercial businesses includes many points of information on the 402 businesses listed. The list is divided into six sections: Business Information; Tote Information; Metrics Sources; Food Waste Estimates Analysis, Various Metrics – Weekly & Yearly; Annual Food Waste Estimates; and Recycling Information. The information found in each list's six sections is noted in Appendix C. Food Waste Estimates. The lists by section are also found in Appendix C; the Tote Information section is only available to Kingston DPW for privacy reasons.

[110] "Organic Resource Locator", New York State Pollution Prevention Institute, https://www.rit.edu/affiliate/nysp2i/OrganicResourceLocator/. Accessed January 2020.

[111] "Sustainable Management of Food – Excess Food Opportunities Map", US EPA, https://www.epa.gov/sustainable-management-food/excess-food-opportunities-map. Accessed June 2020.

[112] "Excess Food Opportunities Map Version 2.1 – Technical Methodology", US EPA, April 2020, https://www.epa.gov/sites/production/files/2020-04/documents/efom_v2.1_technical_methodology-clean_v2.pdf.

[113] "Economic Census: NAICS Codes & Understanding Industry Classification Systems", US Census, https://www.census.gov/programs-surveys/economic-census/year/2022/guidance/understanding-naics.html. Accessed November 2022. "The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy."

2.1. Business Type of Commercial Businesses

The 402 commercial businesses listed appeared across 15 business types, applying the business type categories identified by Kingston DPW. Figure 8. Commercial Businesses shows Restaurant as the most frequent business type represented, followed by Retail, Service, and Office.

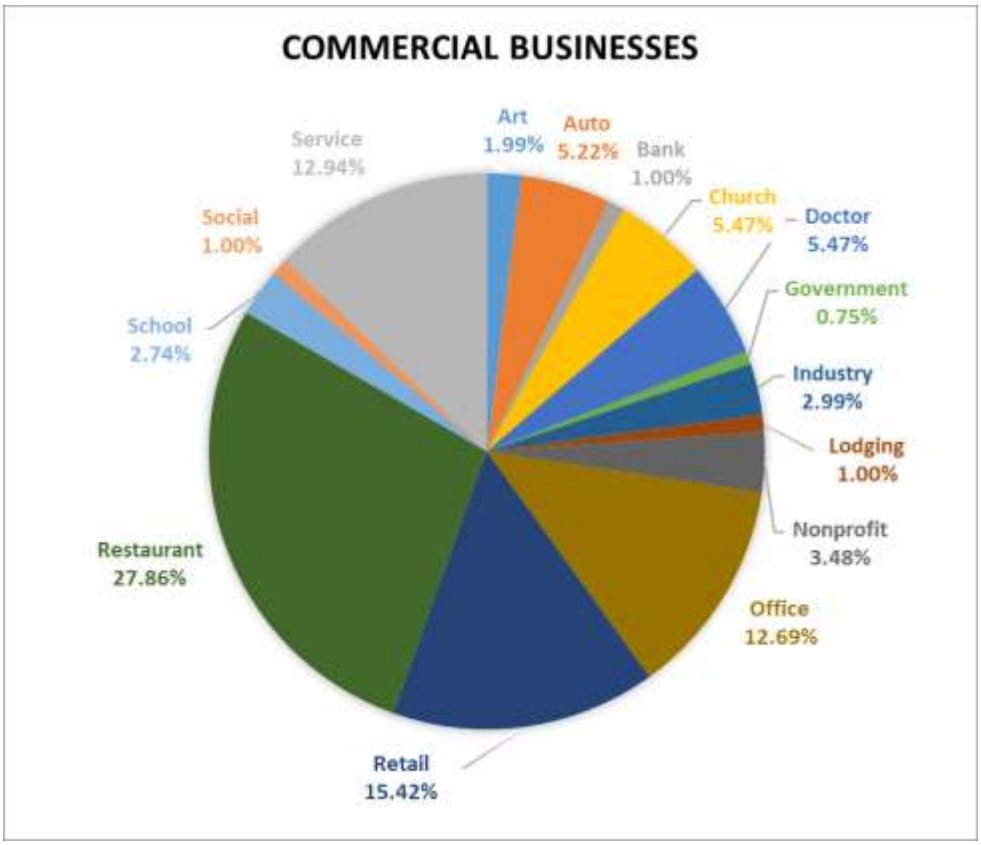


Figure 8. Commercial Businesses. This chart shows the proportion of businesses included in the analysis list by business type, applying the Kingston DPW category types.

2.2. Source of Listed Commercial Businesses

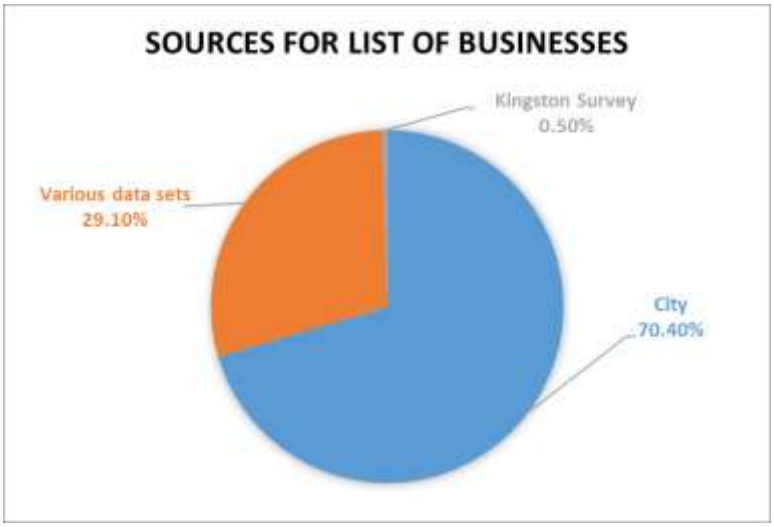


Figure 9. Sources for List of Businesses. Sources for the list of businesses included City of Kingston DPW, NYSDOH, NYSP2I, EPA FOM, and the Kingston Composting Survey.

The majority of businesses, 283 were drawn from the City DPW list (70.40%), with 117 (29.10%) drawn from the NYSDOH, NYSP2I, and EPA FOM lists; some businesses were found on combinations of the latter three lists. Only two businesses (0.50%) were drawn only from the Kingston Composting Survey. This distribution is visually represented in Figure 9. Sources for List of Businesses.

2.3. Refuse Collection Distribution

Refuse collection for all listed businesses (402) as well as those producing food waste (188) was predominantly provided by the City as shown in Figure 10. Refuse Collection – All Businesses and Figure 11. Refuse Collection – Businesses Producing Food Waste, at 73.38% and 60.64%, respectively. A larger portion of food waste producing businesses used private haulers for refuse collection (37.23%), as seen in Figure 11.

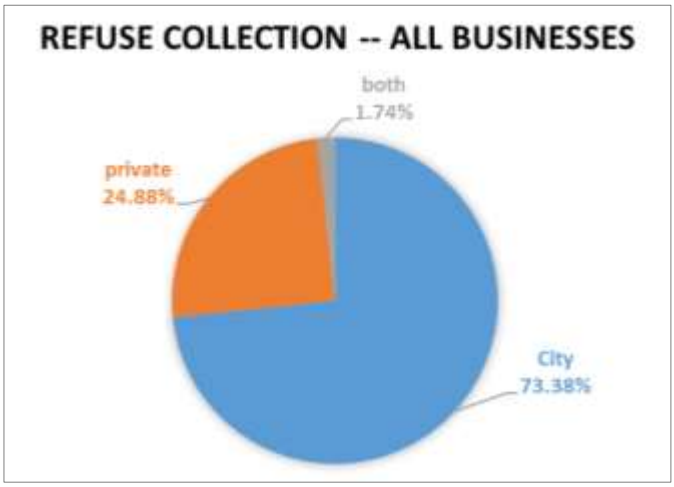


Figure 10. Refuse Collection – All Businesses.

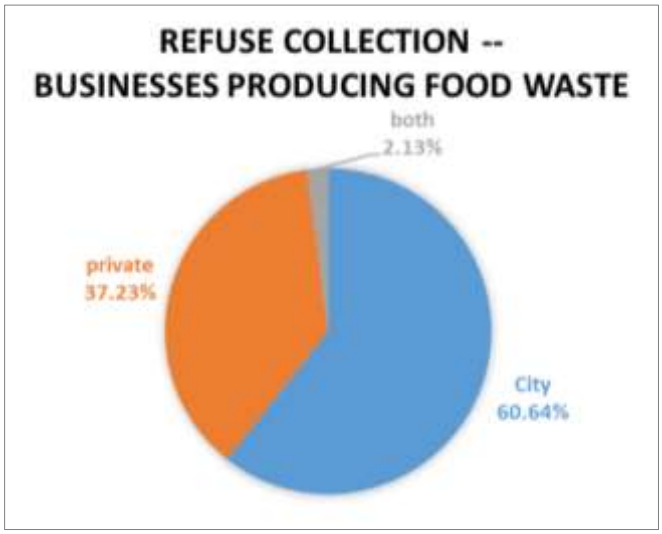
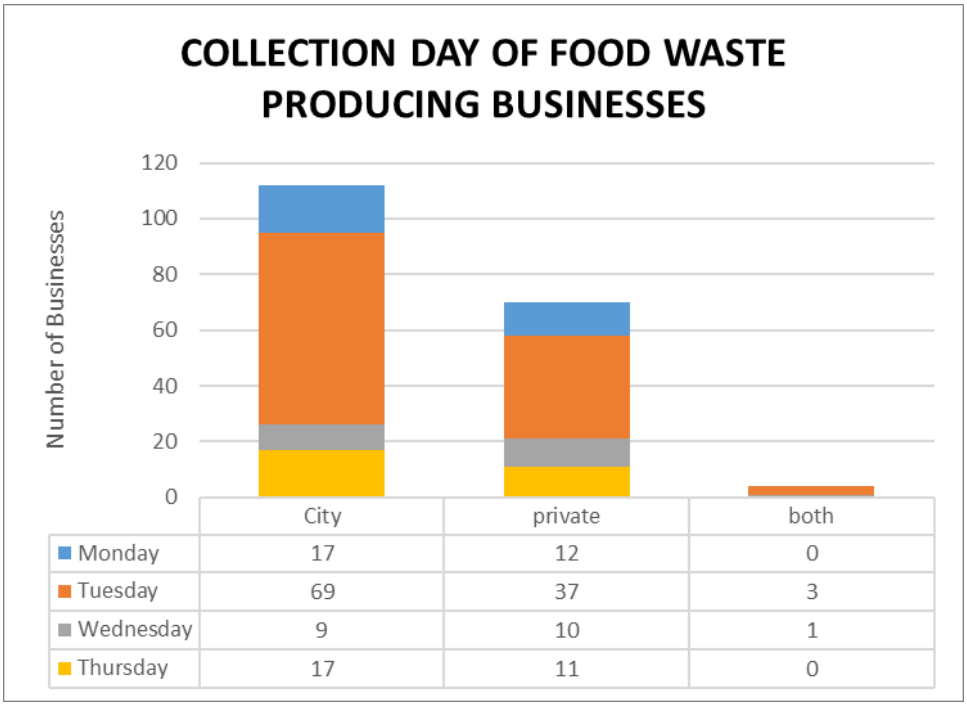


Figure 11. Refuse Collection – Businesses Producing Food Waste.

2.4. Weekday Distribution of Refuse Collection

Figure 12. Collection Day of Food Waste Producing Businesses reveals that most food producing businesses fall on Kingston DPW's Tuesday run. Those food producing businesses with private collection are also mostly located on the Tuesday run. A total of 186 businesses were part of this analysis as two did not provide their refuse collection day.



	City	private	both
Monday	17	12	0
Tuesday	69	37	3
Wednesday	9	10	1
Thursday	17	11	0

Figure 12. Collection Day of Food Waste Producing Businesses. Most food waste producing businesses are located on the City's Tuesday refuse collection run.

2.5. Recycling Collection Distribution

As is shown in Figure 13. Recycling Collection – All Businesses and Figure 14. Recycling Collection – Businesses Producing Food Waste, most of the 402 commercial businesses have recyclables collected by Kingston DPW (89.06% and 75.00%, respectively). For the 188 food waste producing businesses, a larger percentage opt for private haulers for recycling collection, 25.00%, compared with all businesses, 12.94%.

Figure 13. Recycling Collection – All Businesses.

Figure 14. Recycling Collection – Businesses Producing Food Waste.

2.6. Service Class

Food waste estimates were available or developed for 127 food waste producing businesses. The business counts are shown in Figure 15. Service Class, Food Waste Producing Businesses according to their NAICS service classes. Food waste estimates were most readily available or developed for Full-Service and Limited-Service Restaurants.

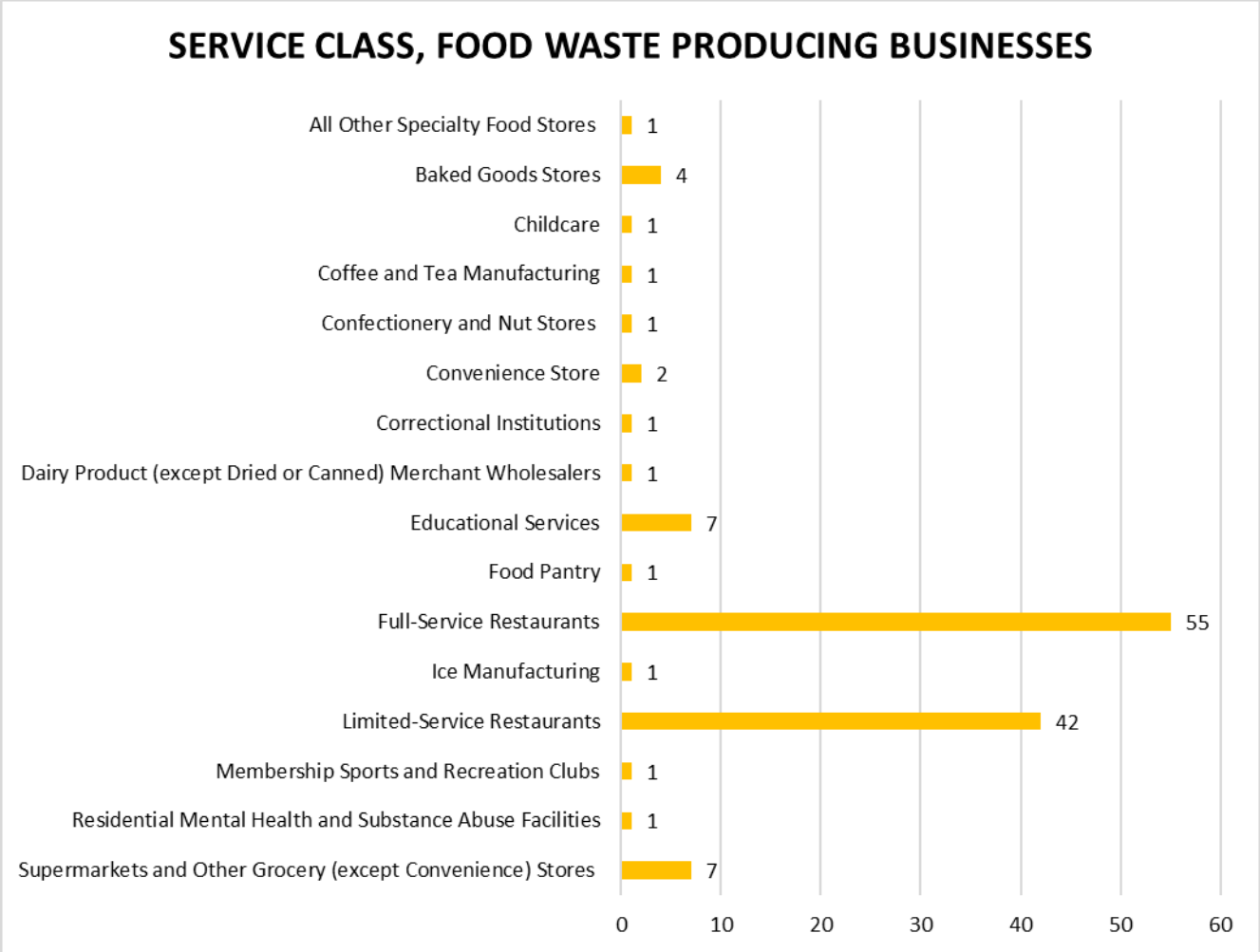


Figure 15. Service Class, Food Waste Producing Businesses.

Table 19. Distribution of Service Class by Refuse Collection shows refuse collection (City, Private, or both) for each service class with an available or developed food waste estimate.

Table 19. Distribution of Service Class by Refuse Collection

Service Class	Total	Refuse Collection		
		City	Private	Both
All Other Specialty Food Stores	1	1		
Baked Goods Stores	4	2	2	
Childcare	1	1		
Coffee and Tea Manufacturing	1		1	
Confectionery and Nut Stores	1	1		
Convenience Store	2		2	
Correctional Institutions	1		1	
Dairy Product (except Dried or Canned) Merchant Wholesalers	1		1	
Educational Services	7	1	6	
Food Pantry	1		1	
Full-Service Restaurants	55	26	26	3
Ice Manufacturing	1		1	
Limited-Service Restaurants	42	29	12	1
Membership Sports and Recreation Clubs	1		1	
Residential Mental Health and Substance Abuse Facilities	1		1	
Supermarkets and Other Grocery (except Convenience) Stores	7	6	1	
Totals	**127**	**67**	**56**	**4**

C. EVENTS ESTIMATE

C.1. BACKGROUND

The City of Kingston's recurring public events from 2018-2019 were analyzed. The analysis included identifying events supported or hosted by the City, determining which events would be suitable for food waste collection, developing an estimate of divertible food waste produced, and reviewing the City's event application process in relation to the roll-out and implementation of a food waste collection program for events. Of the 73 events identified, a total of 50 events were included in the final analysis. A literature review provided the basis from which conversion metrics were developed for the Kingston analysis.

C.2. OVERVIEW

Kingston is a vibrant city with a variety of events that are enjoyed by both residents at large and specific communities of constituents. The City takes great pride in facilitating celebrations that are important to the local economy, many of which bring tourists, seeing over 21,000 attendees annually. This section analyzes the viability of implementing a food waste collection program at events, both City-supported and City-hosted, by assessing quantitative and qualitative data collected for the 50 events, determining the viability of program implementation based on the data collected, developing waste estimations for events suitable for organics collection, and reviewing the events application processes and events management under the current two primary points of contact.

The conversion metrics developed for this analysis are discussed in this Study's Appendices, Appendix C. Food Waste Estimates, "Events Estimate", "Metrics". An overview of the waste estimations is provided in Table 20. Estimated Waste Production and Costs from All Events. This table is divided into two sections, Disposal Costs and Diversion Savings. Disposal Costs represents the estimation of existing waste across all waste streams for the 50 events included in this analysis. Diversion Savings represents the anticipated savings from implementing food waste and recycling collection programs. Total Tons/Year and Divertible Tons/Year are based on the conversion factors developed, which used attendee estimates to calculate waste production. Annual Disposal Costs and Diversion Savings are based on UCRRA's cost per ton disposal fee of $110/ton. Diversion savings do not include the cost of items like containers, education, signage, and bags, for example. With the implementation of successful food waste and recycling collection programs at both City-hosted and -supported events, there would be projected savings of $30,750.35 from disposal costs; for City-hosted events only, the projected cost savings from disposal costs would be $21,722.81.

Table 20. Estimated Waste Production and Costs from All Events

Estimated Waste Production and Costs from Events				
Disposal Costs	**Food Waste**	**Recycling**	**Refuse**	**Totals**
Total Tons/Year	111.92	167.63	83.92	**363.46**
Annual Disposal Costs	$12,311.04	$18,439.31	$9,230.72	**$39,981.08**
Diversion Savings	**Food Waste**	**Recycling**	**Refuse**	**Totals**
Divertible Tons/Year	111.92	167.63		**279.55**
Diversion Savings	$12,311.04	$18,439.31		**$30,750.35**

C.3. RECOMMENDATIONS FROM EVENTS WASTE ESTIMATES

- **Implement organics and recycling collection at City-hosted and -sponsored events.** The City is losing approximately $30,750.35 annually in tipping fees for City-hosted and -sponsored events, with $21,722.81 in tipping fees specifically for City-hosted events. Landfilled food waste as well as recyclables account for these tipping fees, with high contamination rates in the recycling waste stream accounting for their landfilling. Implementing 3- or 2-bin waste stations at City-hosted events and requiring stations at sponsored events would enable the City to improve waste diversion practices for recycling during the piloting and promotion of organics diversion. Parades, festivals, and events at the waterfront, which were listed as long-term implementation opportunities, would require an assessment of event site planning practices to identify changes that would optimize organics and recycling collection. If the City does not require compostable food ware, event hosts can offer preferred placement or reduced fees for vendors providing these items.
- **Work closely with financially responsible parties to roll-out food waste and recycling collection at events.** Roll-out of a diversion program at events will require six months lead time to gather stakeholders, inform them of the upcoming program, and gather concerns. These concerns can be incorporated into a Vendors' Waste Management Guide.[114] Initial notification of vendors should occur on approval of a new City policy, with subsequent notifications no

[114] Louisville Metro's Solid Waste Management Services Division, Special Event Recycling and Waste Reduction Best Practice Guide, February 2014.

more than 6 months prior to roll-out at first event, at application distribution, and two weeks prior to an event.

- **Institute outreach and education components for all events.** High contamination rates associated with recycling diversion necessitate a comprehensive education and outreach campaign for event hosts and attendees to ensure the success of organic and recyclable waste diversion at events. Outreach and education, for Kingston staff, and event attendees and vendors, will be critical to the success of an initial implementation and ongoing maintenance of a food waste diversion program for events. Diversion program success will require staff's repeated conversations with events hosts and vendors to ensure an understanding of successful implementation of the diversion program. Staff with the greatest interaction opportunities with event hosts and vendors would be most suitable. An outreach and education opportunity that can incentivize waste diversion would be an annual award for the most eco-friendly event (compostables use, outreach & education, low contamination of compostables, high diversion rate overall).
- **Develop a Vendor Waste Management Guide.** Clear communication with vendors regarding requirements, expectations, and specific instructions both prior to and during events will increase food waste and recycling diversion as well as reduce contamination. This vendor-oriented guide will also serve as an educational tool for events hosts for City-supported events and as an educational guide for City staff who will engage with events hosts and vendors. The Guide should be included in the vendor application process and in any pre-event communications with vendors. The Guide should list the acceptable contents for each bin. Guides should be periodically updated by confirming with UCRRA for acceptable recyclables and the composting facility for acceptable food waste and compostable serving ware. Kingston staff should inform vendors of these changes on sharing of vendor application. When events are managed by a non-City department, the Guide should require vendor preparation of a site plan as part of pre-event preparations, clearly indicating the location of waste stations. For City-hosted events, the City should move toward centralizing food and drink concession areas in fewer locations to maximize food waste diversion.
- **Institute vendor waste stations in concession areas accessible only to vendors.** The vendor waste station should include a station for unsoiled cardboard and paper, with instruction on acceptable and inacceptable cardboard and paper. Instruction should include information on the compostability of unbleached paper towels and napkins. Vendor waste stations should include signage that is clearly labeled with icons or images to encourage proper disposal. On the day of the event, Kingston staff or attendee waste station volunteers should meet with vendors to review vendor waste stations guidelines. These stations should not be managed by attendee waste station volunteers.
- **Establish a volunteer program for attendee waste station management at events.** Volunteers are typically called Green Team members, Compost Guides, or Waste Ambassadors. They are also recommended for events at which only recycling and refuse will be collected as waste ambassadors can reduce the level of contamination that has prevented collected recyclables from being recycled. As the City's appointed volunteer committee members cannot be expected to serve as waste station volunteers in addition to their existing responsibilities, the City should consider hiring college or high school students to serve in this capacity. This option could also meet the City's social justice goals if high schools in lower wealth communities are encouraged to apply. The City can consider providing waste station volunteers to non-hosted

City events at a cost to the event or require that the event provide their own waste station volunteers.

- **Develop a Volunteer Waste Station Guide.** The Guide should outline in detail the content that can be included in each waste station's bins and how to engage with the general public in a non-confrontational manner. The Guide should be periodically updated in partnership with UCRRA and the City's composting entity. Instituting behavior change at events will require repeated and regular engagement with event attendees.
- **Locate clearly identified waste stations for event attendees in highly visible and convenient locations with high volumes of waste generation.** This includes near food and drink concession areas, picnic areas, restrooms, entrances, and exits.[115] Each waste station should be clearly marked, with colorful and clear signage identifying the content to be placed in each bin. Only enough words should be used to clarify the icons or images that will direct proper waste placement. This serves to enforce the information that waste station volunteers may, or may not, have a chance to convey to event attendees.
- **Implement organics collection at municipal recreation facilities for events organized by large entities.** Rental application data analyzed over a four-year period from the beginning of 2016 to the end of 2019 revealed that large entities hosted events anticipating 48,305 total attendees across 220 applications. Large attendee events can produce a significant amount of food waste, which represents a high disposal cost by weight. Large entities typically have more organizational capacity and are often repeat users of the City's recreation facilities; both traits are beneficial for the implementation of a targeted organics collection program as they minimize the City's administration burden. Examples of large entities include Unity in the Community and Drum & Bugle Corp organizers, Kingston schools, and Kingston Recreation Department summer programming.
- **Establish an organics collection pilot program at select municipal recreation facilities for events organized by individuals.** During the same period analyzed, events organized by individuals submitted 589 applications that reported an expected attendance of 24,910 total persons. While many applicants may be repeat users of the City's recreation facilities, the number of applicants represents over twice the number of applications submitted by large event organizers. This presents a significant administrative burden for City staff's program implementation with regards to, in particular, educational engagement around contamination reduction. The City should consider establishing an organics collection pilot program for select municipal recreation facilities rented by individuals. The pilot program should be implemented at a minimum of two of the recreation facilities receiving the highest number of applications: Hasbrouck Park Stone Building, Forsyth Park Pavilion, and Kingston Point Beach Pavilion.
- **Recommendations related to the application process and use of ActiveNet are discussed in "Recommendations from Events Staff" and "Recommendations from Recreation Facilities Waste Assessments".**

C.4. EVENTS

The City's Sustainability Coordinator Julie Noble facilitated the identification of all events typically hosted or supported by the City in a given year. A total of 73 events were originally identified for consideration, with 50 included in the analysis. The events analyzed included car shows, events held at

[115] Louisville, "Best Practices Guide".

Dietz Stadium (band competitions, games), festivals, parades with controlled food distribution areas, races (bike & road), and rallies providing controlled food distribution areas. Events with no food vendors, but where City recycling collection is provided, were also included. Excluded events included block parties, film shootings, events where waste collection is handled through private haulers, non-recurring events, and events with less than 100 attendees. The events included in the analysis are listed below in Table 21. City of Kingston Events Analyzed.

Table 21. City of Kingston Events Analyzed

4th of July Celebration	Children's Day Parade	Kingston Earth Fair	March of Champions Drum & Bugle Corps	Shamrock Run
African American Festival	Christmas Party	Kingston Farmers Market	Maritime Festival, Boat Show, Boat Building	Sinterklaas
Antique Fire Engine Muster	Forsyth Nature Center Fall Festival	Kingston Multicultural Festival	Memorial Day Ceremony and Parade	Snowflake Festival
Artists Soap Box Derby	Holiday Craft Fair	Kingston Paddle Fest (Kayak Festival)	Midtown Make a Difference Day	St. Patrick's Day Parade
Biddy Basketball Games	Hooley on the Hudson	Kingston Stockade Football Club	Music/Movies in the Park	Sustainability Fair
Biddy Basketball Banquet	Hudson Valley Hullabaloo	Kingston Waterfront Farmers Market	O+ Festival	Tour de Kingston
Black History Month	Indoor Volleyball	Kiwanis Kingston Classic	Postcard Show	Train Show
Boo at the Zoo	Italian American Festival	KPFFA Breakfast	Radio Kingston Anniversary	Turkey Trot
Boxing Tournament	KHS football games	Let's Move Ulster Health and Wellness Fair	Reindeer Ramble	UCCA Senior Dinner
Burning of Kingston	KHS Homecoming Parade	Made in Kingston	Relay for Life	YMCA Kids Classic

Interviews were conducted with various City staff to gain an understanding of current waste management practices and challenges at events, including Sustainability Coordinator Julie Noble, former DPW Laborer Foreman Michael McCreery, Mayor Steve Noble, Recreation Leader/Environmental Educator KC Keegan-Twombly, Parks and Recreation Director Lynsey Timbrouck, and DPW Clerk Lisa Bruck.[116] In addition to these City representatives, Kingston High School and Kingston Stockade Football Club provided data or information for this analysis.

[116] At the time of this study, Lindsey Timbrouck served as Special Events Coordinator and Lisa Bruck served as Parks & Rec Clerk.

1. OVERVIEW OF ANALYZED EVENTS

Thirty points of information were collected and developed for the events analyzed. Included are quantitative data, qualitative data, analysis points, and waste estimations, which are broadly described in the below bullets. City staff, noted in the prior section, provided information incorporated to the quantitative and qualitative data sections; analysis points were finalized with the City's Sustainability Coordinator; waste estimations were calculated using conversion factors developed for this study. Additional details on the points of information collection are provided in the following sections.

- Quantitative Data: Table 22. City of Kingston Events Held Annually – Quantitative Data provides event attendee estimate, annual event frequency and length, the City's role (hosting or supporting), type of application(s) completed, City point of contact, City services provided, parties responsible for event costs, event location, food vendors, and event website.
- Qualitative Data: Table 23. City of Kingston Events Held Annually – Qualitative Data provides responsible party interest in green event practices, assessment on ease of waste management, likelihood of compostable products use, and recycling challenges encountered.
- Implementation Assessments: Table 24. City of Kingston Events Held Annually – Implementation Assessments provides waste station type, timeframe for incorporation into food waste collection program (Program Timing), and ease of managing food waste collection.
- Waste Estimations: Table 25. City of Kingston Events Held Annually – Waste Estimates (Pounds) provides estimates developed for food waste, recycling, and refuse.

1.1. Quantitative Data

- Event Attendee Estimates: The event attendee estimates for the 50 events analyzed ranged from 100 attendees to approximately 6,333. The attendee estimates are an average of estimates from event application forms, if completed, as well as estimates from Kingston Mayor Steve Noble and Kingston Sustainability Coordinator Julie Noble. The number of events across various attendee tranches appear in Table 26. Event Attendance.

Table 26. Event Attendance

Attendee Categories	Number of Events
250 & under attendees	9
251 – 500 attendees	11
501 – 1,000 attendees	14
1,001 – 2,500 attendees	9
2,501 & over attendees	7
Total Events:	**50**

- Annual Event Frequency and Length: Annual event frequency appears as "Times Held per Year" and length appears as "Event Length (Days)" in Table 22. Of the 50 events analyzed, 44 were annual events taking place only once a year and six were recurring seasonal events. The recurring seasonal events included Biddy Basketball Games, Kingston High School Football Games, Kingston Farmers Market, Kingston Stockade Football Club games, Kingston Waterfront Farmers Market, and Music/Movies in the Park. Two events are held across multiple days: Biddy Basketball Games (recurring seasonal event) and O+ Festival (annual event).
- City's Role: The majority of events are City supported, 35, with 15 hosted by the City. City-hosted events are those that the City coordinates and pays for. City-supported events are

private events for which the City provides services, such as refuse and recycling collection or police presence. For the purposes of this Study, only data on waste collection was gathered.

- Application(s) Completed: A total of 46 applications were available for the 50 events analyzed across the three different applications available for events: Facility, Event, and Vendor Applications. A combined total of 18 events either completed no applications (six) or none were on file (12). Depending on the event needs and/or size, some events completed a combination of applications. A complete discussion of the City's events application process is found in this Study in "Application Process".
- City Point of Contact: There are two primary points of contact for all City-hosted or -supported events: Parks & Rec staff or the Special Events Coordinator, who is also the Mayor's Confidential Secretary. Applications were roughly equally divided between both points of contact, with 24 events managed by Parks & Rec staff, 25 by the Special Events Coordinator, and one managed by both.
- City Services Provided: The majority of events (38) included refuse and recycling collection, followed by 11 receiving only refuse collection, and one receiving only recycling collection.
- Financially Responsible Parties: Event costs for those events hosted by the City (15) are paid for by the City. The balance (35) are paid for by the private entity responsible for the event.
- Event Location: Of the 50 events analyzed, 48 were held at City-owned or managed locations, such as City facilities, and streets. Two were held at private locations.
- Food Vendors: Two separate data points were collected related to food vendors, the concentration of food vendors and the number of food vendors. A total of 16 events had no food vendors. A combined total of 34 events had food vendors, with 24 events having 10 vendors or less, six events with 11 vendors or more, and four events where the number of food vendors is unknown. Of the 33 events with food vendors present, the food vendors had a localized distribution in one to three areas. For one event, food vendor distribution was diffused, or spread out over a large area.
- Recycling Collected: Information on collection practices was collected. Of the 50 events analyzed, the City provided recycling collection services for 38; 10 did not receive City recycling collection services. For two events it was unknown whether the City provided these services.
- Event Website: Event websites are available for 47 of the 50 events analyzed. The City manages the websites for eight of the events. One City-hosted event and two City-supported events have no known websites.

Table 22. City of Kingston Events Held Annually – Quantitative Data

Event	Event Attendee Estimate	Times Held per Year	Event Length (Days)	City's Role: Host or Support	Application(s) Completed?	City Point of Contact	City Services Provided?	Financially Responsible Parties	Event Location Noted where held on private property.	Food Vendor Concentration (vendors concentrated in set areas v diffused throughout)	# Food Vendors	Recycling Collected?	Event Website
4th of July Celebration	6,000	1	1	hosted	Event & Vendor	Special Events Coordinator	trash & recycling collection	City	Rondout Waterfront	diffused	15+	yes, City	https://kingston-ny.gov/
African American Festival	2,000	1	1	supported	Event & Vendor	Special Events Coordinator	trash & recycling collection	Harambee	Rondout Waterfront or Andy Murphy Neighborhood Center	localized (1-3 areas)	15+	yes, City	http://www.harambeekingstonny.org/index.php/events/african-american-cultural-festival
Antique Fire Engine Muster	200	1	1	supported	Event	Special Events Coordinator	trash & recycling collection	Volunteer Fireman's Museum	Fair Street	none	0	yes, City	https://kingstonvolunteerfiremensmuseum.weebly.com/
Artists Soap Box Derby	625	1	1	supported	Event	Special Events Coordinator	trash & recycling collection	Varies	Rondout Waterfront	none	0	yes, City	https://kingstonartistsoapboxderby.com/
Biddy Basketball Banquet	500	1	1	hosted	none	Parks & Rec	trash & recycling collection	City	Andy Murphy Neighborhood Center	localized (1-3 areas)	1	yes, City	http://www.kingstonparksandrec.org/
Biddy Basketball Games	1,100	240	2	hosted	Facility (AN admin)	Parks & Rec	trash & recycling collection	City	Andy Murphy Neighborhood Center	none	0	yes, City	https://www.kingston-ny.gov/biddybasketball
Black History Month	200	1	1	hosted	Event	Parks & Rec	trash & recycling collection	City	Rondout Neighborhood Center	localized (1-3 areas)	1	yes, City	http://blackhistorymonthkingston.org/
Boo at the Zoo	450	1	1	hosted	none	Parks & Rec	trash & recycling collection	City, in partnership with Friends of FNC	Forsyth Park	localized (1-3 areas)	1	yes, City	http://www.forsythnaturecenter.org/
Boxing Tournament	200	1	1	supported	none on file	Parks & Rec	trash & recycling collection	not sure	Andy Murphy Neighborhood Center	none	0	yes, City	http://www.kingstonpal.com/
Burning of Kingston	3,000	1	1	hosted	Event	Special Events Coordinator	trash collection	City	City-wide	none	0	not collected	http://www.burningofkingston.com/
Children's Day Parade	1,500	1	1	hosted	none	Parks & Rec	trash collection	City	City-wide	localized (1-3 areas)	1	not collected	http://www.kingstonparksandrec.org/
Christmas Party	100	1	1	hosted	none	Parks & Rec	trash & recycling collection	City	Andy Murphy Neighborhood Center	localized (1-3 areas)	1	yes, City	
Forsyth Nature Center Fall Festival	1,667	1	1	hosted	Facility (AN admin) / Event / Vendor	Parks & Rec	trash & recycling collection	City, in partnership with Friends of FNC	Forsyth Park	localized (1-3 areas)	3	yes, City	http://www.forsythnaturecenter.org/

Holiday Craft Fair	500	1	1	supported	Vendor	Parks & Rec	trash & recycling collection	not sure	Andy Murphy Neighborhood Center	localized (1-3 areas)	not sure	yes, City	
Hooley on the Hudson	6,333	1	1	supported	Event	Special Events Coordinator	trash & recycling collection	Ancient Order of Hibernians	Rondout Waterfront	localized (1-3 areas)	15+	yes, City	http://www.ulsteraoh.com/hooley-on-the-hudson.html
Hudson Valley Hullabaloo	3,000	1	1	supported	none on file	Parks & Rec	trash & recycling collection	Hudson Valley Hullabaloo	Andy Murphy Neighborhood Center	localized (1-3 areas)	3	yes, City	https://hvhullabaloo.com/
Indoor Volleyball	4,248	1	1	hosted	none	Parks & Rec	trash & recycling collection	City	Andy Murphy Neighborhood Center	none	0	yes, City	https://www.kingston-ny.gov/content/8401/10594/17241/default.aspx
Italian American Festival	5,667	1	1	supported	Event & Vendor	Special Events Coordinator	trash & recycling collection	Italian American Foundation	Rondout Waterfront	localized (1-3 areas)	12	yes, City	https://ucitalianamericanfoundation.org/
KHS Football Games	558	13	1	supported	none on file	Parks & Rec	trash collection	Kingston High School	Dietz Stadium	localized (1-3 areas)	1	not collected	https://www.kingstoncityschools.org/
KHS Homecoming Parade	563	1	1	supported	Event	Special Events Coordinator	trash collection	Kingston High School	Dietz Stadium	none	0	not collected	https://www.kingstoncityschools.org/site/default.aspx?PageType=3&DomainID=8&ModuleInstanceID=4969&ViewID=6446EE88-D30C-497E-9316-3F8874B3E108&RenderLoc=0&FlexDataID=16071&PageID=9
Kingston Earth Fair	567	1	1	hosted	Facility (AN) / Vendor	Parks & Rec	trash & recycling collection	City	Forsyth Park	localized (1-3 areas)	3	yes, City	https://www.kingston-ny.gov/earthfair
Kingston Farmers Market	1,500	40	1	supported	none on file	Special Events Coordinator	trash collection	Farmers Market Committee	Uptown Kingston	localized (1-3 areas)	42	not collected	http://kingstonfarmersmarket.org/
Kingston Multicultural Festival	625	1	1	supported	Event & Vendor	Special Events Coordinator	trash & recycling collection	Reher Center	Rondout Waterfront or Andy Murphy Neighborhood Center	localized (1-3 areas)	3	yes, City	https://www.rehercenter.org/
Kingston Paddle Fest (Kayak Festival)	275	1	1	hosted	Facility (AN w/admin) / Vendor	Parks & Rec	trash & recycling collection	City, in partnership with Kenco	Kingston Point Beach	localized (1-3 areas)	1	yes, City	https://www.atkenco.com/info/2019-kingston-paddle-fest
Kingston Stockade Football Club	789	7.25	1	supported	Vendor	Parks & Rec	trash collection	Stockade Football Club	Dietz Stadium	localized (1-3 areas)	3	not collected	https://www.stockadefc.com/about
Kingston Waterfront Farmers Market	333	24	1	supported	Facility (paper)	Parks & Rec	trash & recycling collection	Kingston Waterfront Business Association	Downtown Kingston (TR Gallo Park)	localized (1-3 areas)	20 listed, but about 12 attend	yes, City	https://www.thekingstonwaterfront.com/farmers-market
Kiwanis Kingston Classic	650	1	1	supported	Event	Special Events Coordinator	trash collection	Kiwanis Club	Rondout Waterfront	localized (1-3 areas)	1	not known	http://www.kiwaniskingstonclassic.com

KPFFA Breakfast	100	1	1	supported	none on file	Parks & Rec	trash & recycling collection	KPFFA	Andy Murphy Neighborhood Center	localized (1-3 areas)	1	yes, City	http://www.kpffa.org/
Let's Move Ulster Health and Wellness Fair	283	1	1	supported	Facility (AN) / Event	Special Events Coordinator	trash & recycling collection	Center for Creative Education	TR Gallo Park	none	0	yes, City	http://cce4me.org/
Made in Kingston	1,067	1	1	supported	Event	Special Events Coordinator	recycling collection	Business Alliance of Kingston	Location varies: usually private	localized (1-3 areas)	6	not known	http://madeinkingstonny.com/
March of Champions Drum & Bugle Corps	1,633	1	1	supported	Facility (AN) / Event	other: Special Events Coordinator and Parks & Rec	trash collection	Children's Home of Kingston	Dietz Stadium	localized (1-3 areas)	1	not collected	https://www.chkingston.org/
Maritime Festival, Boat Show, Boat Building	917	1	1	supported	Event & Vendor	Special Events Coordinator	trash & recycling collection	HRMM	HRMM: Private	localized (1-3 areas)	1	yes, City	http://www.hrmm.org/
Memorial Day Ceremony and Parade	625	1	1	hosted	none on file	Special Events Coordinator	trash collection	City; planning by VFW	Broadway	none	0	not collected	https://kingston-ny.gov/
Midtown Make a Difference Day	750	1	1	hosted	none	Parks & Rec	trash & recycling collection	City	Franklin Street	localized (1-3 areas)	1	yes, City	https://kingston-ny.gov/
Music/Movies in the Park	100	12	1	hosted	Facility (AN admin)	Parks & Rec	trash & recycling collection	City	various City locations	none	0	yes, City	http://www.kingstonparksandrec.org/
O+ Festival	4,333	1	3	supported	Facility (AN) / Event / Vendor	Special Events Coordinator	trash & recycling collection	O+	Uptown Kingston, many City streets	none	0	yes, City	http://opositivefestival.org/
Postcard Show	567	1	1	supported	none on file	Parks & Rec	trash & recycling collection	Postcard Show	Andy Murphy Neighborhood Center	localized (1-3 areas)	not sure	yes, City	http://kaaterskillpostcardclub.com/
Radio Kingston Anniversary	1,000	1	1	supported	none on file	Parks & Rec	trash & recycling collection	Radio Kingston	Andy Murphy Neighborhood Center	localized (1-3 areas)	1	yes, City	https://radiokingston.org/
Reindeer Ramble	188	1	1	supported	Event	Special Events Coordinator	trash & recycling collection	YMCA Ulster	City streets	none	0	yes, City	http://www.ymcaulster.org/sponsors-spotlight/36th-annual-reindeer-ramble-5k-race-walk/
Relay for Life	1,250	1	1	supported	none on file	Special Events Coordinator	trash collection	Relay for Life	Dietz Stadium	localized (1-3 areas)	not sure	not collected	https://secure.acsevents.org/site/SPageServer/?pagename=relay
Shamrock Run	467	1	1	supported	Event	Special Events Coordinator	trash & recycling collection	Ancient Order of Hibernians	Rondout Neighborhood Center	localized (1-3 areas)	1	yes, City	https://www.shamrockrun.org/

Sinterklaas	300	1	1	supported	Event	Special Events Coordinator	trash & recycling collection	Sinterklaas Hudson Valley	Rondout Waterfront	none	0	yes, City	https://www.sinterklaashudsonvalley.com
Snowflake Festival	500	1	1	supported	Event	Special Events Coordinator	trash & recycling collection	KUBA	Uptown Kingston, streets and private properties	none	0	yes, City	https://kingstonuptown.org/initiatives/snowflake-festival/
St. Patrick's Day Parade	2,500	1	1	supported	Event	Special Events Coordinator	trash & recycling collection	Ancient Order of Hibernians, in partnership with City	Broadway, Rondout Waterfront	localized (1-3 areas)	1	yes, City	http://ulsteraoh.com/Parade.htm
Sustainability Fair	1,000	1	1	supported	Facility (AN admin)	Parks & Rec	trash & recycling collection	private	Andy Murphy Neighborhood Center	localized (1-3 areas)	not sure	yes, City	
Tour de Kingston	250	1	1	supported	Facility (AN) / Event	Special Events Coordinator	trash & recycling collection	YMCA Ulster	Forsyth Park, Streets	localized (1-3 areas)	0	yes, City	https://www.tourdekingston.com/
Train Show	750	1	1	supported	none on file	Parks & Rec	trash & recycling collection	Train show	Andy Murphy Neighborhood Center	localized (1-3 areas)	1	yes, City	https://kingstontrainshow.com/author/jimmykmts/
Turkey Trot	500	1	1	supported	Event	Special Events Coordinator	trash & recycling collection	Junior League of Kingston	Forsyth Park, Streets	none	0	yes, City	https://turkeytrotkingston.com/
UCCA Senior Dinner	500	1	1	supported	none on file	Parks & Rec	trash & recycling collection	UCCA	Andy Murphy Neighborhood Center	localized (1-3 areas)	1	yes, City	https://uccac.org/
YMCA Kids Classic	175	1	1	supported	none on file	Parks & Rec	trash collection	YMCA Ulster	Dietz Stadium	localized (1-3 areas)	1	not collected	http://www.ymcaulster.org/wp-content/uploads/2018/02/Kids-Classic-Registration-Form.pdf

1.2. Qualitative Data

Unless otherwise noted below, qualitative data for each event was provided by the City's Sustainability Coordinator based on the Coordinator's past work with the list of City events included in this analysis. Where information is unavailable or unknown, the Coordinator had either not had significant engagement, or any at all, with a specific event to be able to provide an assessment with certainty. The purpose of these assessments was to gauge the degree of culture change that would be necessary to successfully implement a food waste collection program for events.

- Interest in Green Event Practices: The interest in green event practices by event responsible parties, or sponsors, was assessed based on the understanding or familiarity of the Sustainability Coordinator with the responsible party. The expected interest is distributed as follows: 20 event sponsors are expected to be interested in green event practices (Yes), 25 events are possibilities (Maybe), and five events are unknown (Unknown). A more detailed analysis of the expected interest appears in Table 27. Interest in Green Event Practices. Of the 12 City-sponsored and controlled events, six events were categorized as possibilities (Maybe) due to the expected ease of implementing a food waste collection program. Four of the six events are held at the Andy Murphy Neighborhood Center, which has struggled with significant contamination in its recycling bins; one event has no food vendors and takes place along a mile+ long route; and another event is attended by thousands of people on the Rondout Waterfront, with over 15 vendors diffusedly located in the large event area.

Table 27. Interest in Green Event Practices

	Event Sponsor			
Green Event Interest	**City**	**Private**	**Unknown**	**Total**
Yes	14	6	0	20
Maybe	1	22	2	25
Unknown	0	5	0	5
Total	15	33	2	50

- Assessment on Ease of Waste Management: Each event was assessed for the ease of implementing a food waste collection program. The assessment was based on waste management practices observed during past events and/or identification of common locational features. Key commonalities were noted and are bulleted below.
    - Whether an event is hosted by the City or a private event at which City waste management services are provided, Dietz Stadium Complex, Andy Murphy Neighborhood Center, Rondout Neighborhood Center, Forsyth Park were noted as locations where the City could manage implementation of food waste collection due to the location size – the Centers – or controllable space – the Complex and Park. A total of 26 events were held at these locations, with eight events hosted by the City and the balance private events. Attendees at Dietz Stadium Complex ranged from 175 to 1,633 persons; at Andy Murphy Neighborhood Center ranged from 100 to 4,248 persons; at Rondout Neighborhood Center ranged from 200 to 467 persons; and at Forsyth Park ranged from 250 to 1,667 persons.
    - Events held over large areas or multiple locations were assessed to be more challenging, with significant waste outside of waste receptacles and no centralized food vendor

location observed. Many of these events were held along Broadway (two events with attendees ranging from 625 to 2,500), various City streets (five events with attendees ranging from 188 to 4,333), and on the Rondout Waterfront (eight events with attendees ranging from 300 to 6,333), for a total of 15 events.
    - The controllable spaces of the two privately managed Farmers Markets were assessed to be more easily manageable for food waste collection due to the small event area. Attendee estimates are 333 persons at the Kingston Waterfront Farmers Market and 1,500 at the Kingston Farmers Market in Uptown Kingston.
    - The balance of events, seven, were determined to be less challenging despite being held on City streets or larger venues, such as Kingston Point Beach, because of the small events size or the event being constrained to a small area. Three of these events were hosted by the City and four by private entities.
- Likelihood of Compostable Products Use: Events were assessed for the expected likelihood of event host openness to using compostable products, with the reason for the expected likelihood also provided.
    - Sixteen events were not expected to use compostable products as no food venders were present.
    - It was unclear whether compostable products would be readily used at 13, privately managed events. Six of these events took place at a City neighborhood center; the contamination challenges at the centers informed the likelihood of compostable product use without the addition of significant education and outreach. Two of the events took place at Dietz Stadium Complex; the vendor for one of the events is selected by a planning team. Of the remaining five events, all but one were held on the Rondout Waterfront; planning committees select the vendors for these events.
    - Four events were identified as possibly being open to using compostable products. Four of the events have one vendor and one has three vendors.
    - Seventeen events were identified as being very likely to use compostable products. Ten of the events were City hosted, planned in partnership with private organizations; the balance were privately managed. Ten of the events had only one food vendor, three had three food vendors, one event had six vendors, one had 12 vendors, one had over 15 vendors, and one had 42 vendors.
- Recycling Challenges Encountered: Information on recycling challenges encountered was available for 19 events. Events held at Dietz Stadium Campus are limited by the lack of recycling containers. Six events were noted to have significant contamination; two were held at Forsyth Park and four at the Rondout Waterfront. Three events were City-hosted and three were City-supported. Events where recycling challenges were observed had an attendee range between 567 and 6,333 persons.

Table 23. City of Kingston Events Held Annually – Qualitative Data

Event	Interest in Green Event Practices	Assessment on Ease of Waste Management	Likelihood of Compostable Products Use?	Reason for Likelihood	Recycling Challenges Encountered
4th of July Celebration	yes	Large area, lots of drinking, thousands of people, no one pays attention to recycling, significant contamination.	very likely	vendor selected by planning team	Contamination: Tons of contamination, usually too contaminated to recycle.
African American Festival	maybe		not sure	vendor selected by planning team	
Antique Fire Engine Muster	maybe	Controlled space, but not a City event.	no: no food vendors	n/a -- no food vendor	
Artists Soap Box Derby	don't know	Event spread out along half-mile long route; some trash along route outside of receptacles; no food vendors.	no: no food vendors	n/a -- no food vendor	Contamination: Lots of contamination.
Biddy Basketball Banquet	yes	Controlled space.	very likely	City managed, minimal vendors	
Biddy Basketball Games	yes	Controlled space.	no: no food vendors	n/a -- no food vendor	
Black History Month	maybe	Controlled space.	very likely	City managed, minimal vendors	
Boo at the Zoo	yes	Controlled space, extremely small event, small impact. Internally hosted by Parks & Rec; provides food.	very likely	City managed; use compostable products	Minimal recycling created, most trash is candy wrappers or popcorn bags.
Boxing Tournament	maybe	Controlled space.	no: no food vendors	n/a -- no food vendor	
Burning of Kingston	yes	Long event, many locations around town, no central eating area. No location where food being served; trash everywhere, so diffuse.	no: no food vendors	n/a -- no food vendor	None known.
Children's Day Parade	yes	Large area, lots of trash along route outside of receptacles, thousands of people. One central food distribution area at end facilitated compost program implementation. Parks & Rec provides hotdogs.	very likely	City managed, minimal vendors	No curbside recycling totes, so no separation.

Christmas Party	yes	Controlled space.	very likely	City managed, minimal vendors	
Forsyth Nature Center Fall Festival	yes	Controlled space. Smallish event held over small area. Only six trash locations.	very likely	City managed; use compostable products	Contamination.
Holiday Craft Fair	maybe	Controlled space.	not sure	could be convinced	
Hooley on the Hudson	maybe	Large area, lots of drinking, thousands of people.	not sure	vendor selected by planning team	Contamination: Tons of contamination, usually too contaminated to recycle.
Hudson Valley Hullabaloo	maybe	Controlled space.	possibly	could be convinced	
Indoor Volleyball	yes	Controlled space.	no: no food vendors	n/a -- no food vendor	
Italian American Festival	don't know	Large area, lots of drinking, thousands of people,	not sure	vendor selected by planning team	Contamination: Tons of contamination, usually too contaminated to recycle.
KHS Football Games	don't know	City controls Dietz Stadium events.	very likely	City managed, minimal vendors	No recycling totes at Dietz Stadium Complex.
KHS Homecoming Parade	maybe	City controls Dietz Stadium events. In past City used single ton dumpster, which is not always filled. May need to move away from this practice.	no: no food vendors	n/a -- no food vendor	No recycling totes at Dietz Stadium Complex.
Kingston Earth Fair	yes	Controlled space, small event.	very likely	City managed, minimal vendors	Contamination: Even with signage, lots of contamination.
Kingston Farmers Market	yes	Controlled space, few locations.	very likely	vendor selected by planning team	No curbside recycling totes, so no separation.
Kingston Multicultural Festival	maybe	If held at AMNC, controlled with few food locations. If on waterfront, more spread out.	not sure	vendor selected by planning team	
Kingston Paddle Fest (Kayak Festival)	yes	Controlled space, small event; food vendor brought in.	very likely	City managed, minimal vendors	

Kingston Stockade Football Club	don't know	City controls Dietz Stadium events.	very likely	could be convinced	No recycling totes at Dietz Stadium Complex.
Kingston Waterfront Farmers Market	yes	Controlled space, few locations.	very likely	vendor selected by planning team	Victor Stanley street cans used for commingled and trash. Market days create more trash than normal park day. Monday morning collection. High contamination rate results in landfilling of recyclables.
Kiwanis Kingston Classic	maybe	Controlled space, though several water stops; serve food after event for people done running (sandwiches)	very likely	could be convinced	Unknown.
KPFFA Breakfast	maybe	Controlled space.	possibly	could be convinced	
Let's Move Ulster Health and Wellness Fair	maybe	Controlled space, small event.	no: no food vendors	n/a -- no food vendor	
Made in Kingston	yes	Controlled space, extremely small event, small impact.	very likely	could be convinced	
March of Champions Drum & Bugle Corps	maybe	City controls Dietz Stadium events. Large-area event, no recycling receptacles, trash in parking lot in bags; private vendor.	very likely	City managed, minimal vendors	No recycling totes at Dietz Stadium Complex.
Maritime Festival, Boat Show, Boat Building	yes	Controlled space, but not a City event.	not sure	vendor selected by planning team	
Memorial Day Ceremony and Parade	yes	Space spread out along a mile+ long route; lots of trash along route outside receptacles.	no: no food vendors	n/a -- no food vendor	No public recycling receptacles.
Midtown Make a Difference Day	yes	Controlled space, spread out over block.	very likely	City managed, minimal vendors	
Music/Movies in the Park	yes	Controlled space, small impact.	no: no food vendors	n/a -- no food vendor	

O+ Festival	maybe	Long event, many locations around town, no central eating area, trash diffuse and collected everywhere. In past O+ paid for additional totes, but did not in 2019. Staff impact: more frequent waste collection.	no: no food vendors	n/a -- no food vendor	
Postcard Show	maybe	Controlled space.	not sure	could be convinced	
Radio Kingston Anniversary	yes	Controlled space.	possibly	could be convinced	
Reindeer Ramble	maybe	Roadside cans, some road trash.	no: no food vendors	n/a -- no food vendor	
Relay for Life	maybe	City controls Dietz Stadium events.	not sure	vendor selected by planning team	No recycling totes at Dietz Stadium Complex.
Shamrock Run	maybe	Controlled space.	not sure	could be convinced	
Sinterklaas	maybe	Minimal trash created.	no: no food vendors	n/a -- no food vendor	
Snowflake Festival	maybe	Large event, many locations around Uptown, no central eating area.	no: no food vendors	n/a -- no food vendor	
St. Patrick's Day Parade	maybe	Large event, many locations around City, no central eating area. Trash everywhere, but only food at one location. Can compost at one location. Green bagels & beer (cups): AOH.	possibly	could be convinced	
Sustainability Fair	yes	Controlled space.	not sure	could be convinced	
Tour de Kingston	maybe	Controlled space, no food vendors; only bring in snacks like bananas & bagels.	no: no food vendors	n/a -- no food vendor	
Train Show	maybe	Controlled space.	not sure	could be convinced	
Turkey Trot	maybe	Controlled space, no food vendors; no food at all, trash is collected in about 1-3 areas.	no: no food vendors	n/a -- no food vendor	
UCCA Senior Dinner	maybe	Controlled space.	not sure	could be convinced	
YMCA Kids Classic	don't know	City controls Dietz Stadium events.	not sure	could be convinced	No recycling totes at Dietz Stadium Complex.

1.3. Implementation Assessments

The information collected and described in "Quantitative Data" and "Qualitative Information" informed the values assigned to each event for the expected ease of managing food waste collection, the timeframe for incorporating an event into an events food waste collection program, and waste station type. The latter two assessments are described below by the values assigned to the Ease of Managing Food Waste Collection, which were 1-easy, 2-moderate, 3-difficult, and 4-n/a.

- Waste Station Type: This column identifies the recommendations for either 3-bin (refuse, recycling, food waste) or 2-bin (refuse & recycling) waste station. After events were assessed for "Ease of Managing Food Waste Collection", they were then assigned a waste station type most suitable for that event's waste stream. Events with enough food waste production were assigned a 3-bin station; all others were assigned a 2-bin station. Of the events analyzed, 35 were determined to be most suitable for 3-bin waste stations and 15 for 2-bins stations.
- Program Timing: This column provides the recommendations for the timing on rolling out a food waste collection program. Information gathered on "financially responsible party" and "interest in green event practices" as well as "recycling challenges encountered" at specific events informed diversion program implementation timeframes. The near term timeframe was assigned to those events/locations identified as having relatively easy waste management collection issues, mid term for those having moderate waste management collection issues, and long term for those with difficult waste management collection issues. Examples of near term implementation locations include Andy Murphy Neighborhood Center, Dietz Stadium, and Forsyth Park. Mid term implementation is identified for events like St. Patrick's Day Parade, Kingston Earth Fair, and Tour de Kingston. Long term implementation examples include the Kingston Multicultural Festival, Children's Day Parade, 4th of July Celebration, Hooley on the Hudson, Italian America Festival, and African American Festival. One event currently collected food waste, labeled "1-current"; 30 events were determined to be viable for "2-near term" implementation; four events were determined to be viable for "3-mid term" implementation; 14 events were identified as being viable for "4-long term" implementation; and the implementation timeframe for one event, "5-unclear", could not be determined.
- Ease of Managing Food Waste Collection:
    - 1-easy: The integration of food waste collection was expected to be easy at 22 events. These events were assessed to be eligible for a 3-bin waste collection system for each of the waste streams: food waste, recycling, and refuse. The timeframe for incorporating events into a food waste collection program included 1-current (one event), a program already in place; 2-near term (18 events), easily implementable; and 3-mid-term (three events), aligned with moderate-ease of waste collection management. Some additional event attributes are listed below.
        - Twenty-one of these events had from one to 42 food vendors that were concentrated in one to three localized areas, facilitating program implementation. One event, Tour de Kingston, was determined to be viable for a food waste collection program despite having no vendors because snacks like bananas and bagels are consumed at set locations along the different bike routes.
        - With regards to the likelihood of compostable products use at these events, six were identified by the Sustainability Coordinator as not being sure of their interest but likely to use compostable products, three as possibly being

interested and likely to use compostable products, and 12 as being very likely to use compostable products due to primarily being City-managed events.
        - Six events were hosted by the City and 16 were City-supported.
        - A total of 15 events received refuse and recycling collection, six received recycling collection, and one event received only refuse collection.
    - 2-moderate: The integration of food waste collection is expected to be moderately easy at seven events. These events were also assessed to be eligible for a 3-bin waste collection system. The timeframe for incorporating events into a food waste collection program included 2-near term (four events), 4-long term (two events), and 5-unclear (one event, due to minimal food waste produced). Additional event attributes are listed below.
        - Food vendors for all events were concentrated in one to three localized areas, with the number of vendors ranging from one to three.
        - It was unclear whether three City-supported events would use compostable products; one City-supported event was identified as possibly using compostable products; and three were identified as being very likely to use compostable products (two City-hosted and one City supported events).
        - Six of the events received both recycling and refuse collection and one only refuse collection.
    - 3-difficult: The integration of food waste collection was expected to be difficult at six events. These events were also assessed to be eligible for a 3-bin waste collection system. The timeframe for incorporating these events into a food waste collection program included 2-near term (one event) and 4-long term (five events). Additional event attributes are listed below.
        - One City-hosted event had 15+ food vendors over a diffused area, received refuse and recycling collection, and was assessed as being very likely to use compostable products.
        - One City-hosted event had one food vendor in a localized area, received only refuse collection, and was assessed as being very likely to use compostable products.
        - Four City-supported events had up to 15+ food vendors in localized areas and received refuse and recycling collection. It was unclear whether these events would readily use compostable products.
    - 4-n/a: Food waste collection programming was determined to not be viable for 15 events at which no food vendors were present, but were determined to be eligible for a 2-bin waste collection system for recycling and refuse. The timeframe for incorporating or reinvigorating recycling collection at these events was 2-near term (three City-hosted and four City-supported events), 3-mid term (one City-supported event), and 4-long term (two City-hosted and five City-supported events). Those events with a long term implementation timeframe resulted from high recycling contamination rates or locations in large, more difficult to manage areas. With the exception of one City-supported event, refuse and recycling collection is part of the remaining 14 events.
- Other Notes: This column provides additional background on the assessment determinations.

Table 24. City of Kingston Events Held Annually – Implementation Assessments

Event	Waste Station Type	Program Timing	Ease of Managing Food Waste Collection	Other Notes
4th of July Celebration	3-bin	4-long term	3-difficult	Long term because of large number of vendors and current contamination rates. And lots of plastic cups used.
African American Festival	3-bin	4-long term	3-difficult	Long term because Waterfront considered a more difficult area to oversee collection.
Antique Fire Engine Muster	2-bin	3-mid term	4-n/a	Mid term because on City streets.
Artists Soap Box Derby	2-bin	4-long term	4-n/a	Long term because on Waterfront. Mayor believes it will no longer be held because lead organizer for past 15 years has stepped down; no replacement thus far.
Biddy Basketball Banquet	3-bin	2-near term	1-easy	Near term because at City community center.
Biddy Basketball Games	2-bin	2-near term	4-n/a	Near term because at City community center.
Black History Month	3-bin	2-near term	2-moderate	Near term because at City community center. 4-day event on which soul food is served on 1 day. Other days include carnival, speeches, films.
Boo at the Zoo	3-bin	2-near term	1-easy	Near term because P&R hosted. Otherwise unclear because minimal food waste produced.
Boxing Tournament	2-bin	2-near term	4-n/a	Near term because at City community center.
Burning of Kingston	2-bin	4-long term	4-n/a	Long term because City-wide. Event varies over time; 2019 was several sites. 2018 put City whole thing on. More people in town, but don't put out additional cans. No additional collection.
Children's Day Parade	3-bin	4-long term	3-difficult	Long-term because City-wide location. Implementable because can centralize food and only 1 vendor.
Christmas Party	3-bin	2-near term	1-easy	Near term because at City community center.
Forsyth Nature Center Fall Festival	3-bin	2-near term	1-easy	
Holiday Craft Fair	3-bin	2-near term	1-easy	Near term because at City community center.
Hooley on the Hudson	3-bin	4-long term	3-difficult	Long term because of contamination and on Waterfront.
Hudson Valley Hullabaloo	3-bin	2-near term	1-easy	Near term because at City community center.
Indoor Volleyball	2-bin	2-near term	4-n/a	Near term because at City community center.

Italian American Festival	3-bin	4-long term	3-difficult	Long term because of contamination and on Waterfront.
KHS Football Games	3-bin	2-near term	1-easy	Near term because at Dietz. Concessionaire opens.
KHS Homecoming Parade	2-bin	2-near term	4-n/a	Short parade that walks 2 blocks and ends at Dietz gate. Near term because at Dietz.
Kingston Earth Fair	3-bin	3-mid term	1-easy	Mid term because of contamination will require Champion.
Kingston Farmers Market	3-bin	2-near term	1-easy	Near term because controlled space, few locations.
Kingston Multicultural Festival	3-bin	4-long term	2-moderate	Long term because Waterfront location more complicated.
Kingston Paddle Fest (Kayak Festival)	3-bin	2-near term	1-easy	Near term because P&R hosted.
Kingston Stockade Football Club	3-bin	2-near term	1-easy	Near term because at Dietz. Lately have been having concessionaire + 2 food trucks.
Kingston Waterfront Farmers Market	3-bin	2-near term	1-easy	Near term because controlled space, few locations. Recycling collected by Parks & Rec as part of normal TR Gallo Park collection.
Kiwanis Kingston Classic	3-bin	5-unclear	2-moderate	Unclear because minimal food waste produced. Other events held at Waterfront timed as long term implementation.
KPFFA Breakfast	3-bin	2-near term	1-easy	Near term because at City community center.
Let's Move Ulster Health and Wellness Fair	2-bin	2-near term	4-n/a	Near term because would only roll out recycling & controlled space.
Made in Kingston	3-bin	1-current	1-easy	Event brought in Zero to Go, and used Climate Smart Kingston volunteers to sort waste, compost everything possible. An eco-conscious that is an excellent model.
March of Champions Drum & Bugle Corps	3-bin	2-near term	1-easy	Near term because at Dietz. Parking lot collection would need to be addressed.
Maritime Festival, Boat Show, Boat Building	3-bin	4-long term	2-moderate	Long term to encourage partnership with Zero To Go. City then just collects waste at end of day.
Memorial Day Ceremony and Parade	2-bin	4-long term	4-n/a	Long-term because parade length and current waste disposal practices.

Midtown Make a Difference Day	3-bin	2-near term	2-moderate	Near term because short distance, only 1 vendor, and City hosted.
Music/Movies in the Park	2-bin	2-near term	4-n/a	Inconsequential amount of food waste from popcorn & some water & sodas. Near term because Parks managed.
O+ Festival	2-bin	4-long term	4-n/a	Long term because on City streets. Need to address bin #s for event. Pick up more frequently. Parade and festival. Musicians perform for free and doctors give free services to musicians.
Postcard Show	3-bin	2-near term	1-easy	Near term because at City community center.
Radio Kingston Anniversary	3-bin	2-near term	2-moderate	Near term because at City community center.
Reindeer Ramble	2-bin	4-long term	4-n/a	Long term because of event length and low attendee count. Also on City streets.
Relay for Life	3-bin	2-near term	1-easy	Near term because at Dietz. Runs 11am-midnight.
Shamrock Run	3-bin	2-near term	3-difficult	Near term because at City community center. Bagels & beer.
Sinterklaas	2-bin	4-long term	4-n/a	Long term because at Waterfront.
Snowflake Festival	2-bin	4-long term	4-n/a	Long term because of event length and on City streets. Including because a KUBA 2-hr evening event.
St. Patrick's Day Parade	3-bin	3-mid term	1-easy	Mid term because centralized eating location. Determine if do 2-bin system throughout rest of Parade length. City plays a large planning & execution role.
Sustainability Fair	3-bin	2-near term	2-moderate	Near term because at City community center.
Tour de Kingston	3-bin	3-mid term	1-easy	Mid term because can focus on set locations, but not as localized. Different length bike rides with food and water at set locations.
Train Show	3-bin	2-near term	1-easy	Near term because at City community center.
Turkey Trot	2-bin	2-near term	4-n/a	Near term because only 1-3 waste collection points.
UCCA Senior Dinner	3-bin	2-near term	1-easy	Near term because at City community center.
YMCA Kids Classic	3-bin	2-near term	1-easy	Near term because at Dietz.

1.4. Waste Estimations

Waste estimations were developed to gain an understanding of the projected waste produced for the three waste streams from events: food waste, recycling, and refuse. Where food waste was not produced nor collection anticipated, food waste estimates were not developed. The estimates shown in Table 25 are in pounds.

Waste estimates were developed by multiplying the conversion factors developed for each waste stream by the estimated number of attendees and by the number of times a year the event was

projected to be held based on past data. Development of the estimated number of attendees is explained in "Quantitative Data", Event Attendee Estimates.

The conversion factors developed are bulleted below. An explanation of the conversion factors developed per waste stream is provided in this Study's Appendices, Appendix C. Food Waste Estimates, "Events Estimate", "Metrics".

- Pounds of Compostable Waste Per Attendee: 0.577 pounds. Application of this conversion factor to thirty-six events projected to be included in a food waste collection program for events resulted in an estimated collection of 111.92 tons of food waste annually diverted from the landfill.
- Pounds of Recycling Per Attendee: 0.833 pounds. Application of this conversion factor to all 50 events projected to be included in a recycling collection program for events resulted in an estimated collection of 167.63 tons of recycling annually diverted from the landfill.
- Pounds of Refuse Per Attendee: 0.417 pounds. Application of this conversion factor to all 50 events resulted in an estimated landfilling of 83.92 tons of refuse annually.

Table 25. City of Kingston Events Held Annually – Waste Estimations (Pounds)

Event	Food Waste	Recycling	Refuse
4th of July Celebration	3,462.00	4,998.00	2,502.00
African American Festival	1,154.00	1,666.00	834.00
Antique Fire Engine Muster		166.60	83.40
Artists Soap Box Derby		520.63	260.63
Biddy Basketball Banquet	288.50	416.50	208.50
Biddy Basketball Games	152,328.00	219,912.00	110,088.00
Black History Month	115.40	166.60	83.40
Boo at the Zoo	259.65	374.85	187.65
Boxing Tournament		83.30	41.70
Burning of Kingston		2,499.00	1,251.00
Children's Day Parade	865.50	1,249.50	625.50
Christmas Party	57.70	83.30	41.70
Forsyth Nature Center Fall Festival	961.67	1,388.33	695.00
Holiday Craft Fair	288.50	416.50	208.50
Hooley on the Hudson	3,654.33	5,275.67	2,641.00
Hudson Valley Hullabaloo	1,731.00	2,499.00	1,251.00
Indoor Volleyball		1,769.29	885.71
Italian American Festival	3,269.67	4,720.33	2,363.00
KHS Football Games	4,185.56	6,042.58	3,024.92
KHS Homecoming Parade		468.56	234.56
Kingston Earth Fair	326.97	472.03	236.30
Kingston Farmers Market	34,620.00	49,980.00	25,020.00
Kingston Multicultural Festival	360.63	520.63	260.63
Kingston Paddle Fest (Kayak Festival)	158.68	229.08	114.68
Kingston Stockade Football Club	3,300.58	4,764.97	2,385.34
Kingston Waterfront Farmers Market	4,616.00	6,664.00	3,336.00
Kiwanis Kingston Classic	375.05	541.45	271.05
KPFFA Breakfast	57.70	83.30	41.70
Let's Move Ulster Health and Wellness Fair		236.02	118.15

Made in Kingston	615.47	888.53	444.80
March of Champions Drum & Bugle Corps	942.43	1,360.57	681.10
Maritime Festival, Boat Show, Boat Building	528.92	763.58	382.25
Memorial Day Ceremony and Parade		520.63	260.63
Midtown Make a Difference Day	432.75	624.75	312.75
Music/Movies in the Park		999.60	500.40
O+ Festival		3,609.67	1,807.00
Postcard Show	326.97	472.03	236.30
Radio Kingston Anniversary	577.00	833.00	417.00
Reindeer Ramble		156.19	78.19
Relay for Life	721.25	1,041.25	521.25
Shamrock Run	269.27	388.73	194.60
Sinterklaas		249.90	125.10
Snowflake Festival		416.50	208.50
St. Patrick's Day Parade	1,442.50	2,082.50	1,042.50
Sustainability Fair	577.00	833.00	417.00
Tour de Kingston	144.25	208.25	104.25
Train Show	432.75	624.75	312.75
Turkey Trot		416.50	208.50
UCCA Senior Dinner	288.50	416.50	208.50
YMCA Kids Classic	100.98	145.78	72.98
Totals	**223,837.13**	**335,260.23**	**167,831.37**

C.5. APPLICATION PROCESS

The City of Kingston's application process for events has developed organically over time. There are two primary application intake points: the Special Events Coordinator and the Parks & Rec staff. Three types of applications are available to be completed: Facility, Event, and Vendor; which application is submitted under which circumstance is described below. For City-supported events, applications can be completed by paper and online by either the applicant or by City staff with applicant input. For City-hosted events, applications are not always completed. Duplication in application submissions does occur.

- Special Event Application: The Special Event Application is used for events held on City property/streets as well as by hosts requesting City services for events being held on private properties. Available City services include waste collection, street closures, parking restrictions, and other special requests like public transit services or police presence. When applicants request additional services, the Coordinator places the Special Event Application in a shared events folder and alerts the appropriate staff/departments from the events list (Police, Fire, DPW, Safety Officer, etc.) to review the application. Each department reviews upcoming applications to determine tasks and signs off on any required forms.
- Facility Application: The Facility application is used for rental of recreation facilities, such as the City operated community centers and pavilions. As is shown in Figure 16. Applications Completed by City Point of Contact, event organizers can complete the Facility Application through various approaches, as explained below.
    - By submitting a paper version of the Facility Application (paper)
    - By completing the Application directly by using the Parks & Rec online application system called ActiveNet (Facility (AN)). (Additional background on ActiveNet is provided later in this Study in "ActiveNet".)

    - By detailing their event needs to Parks & Rec staff, who then complete the Application on the event organizers' behalf on ActiveNet (Facility (AN admin)). City-hosted events entered into ActiveNet by Parks & Rec staff are also labeled administrative entries (Facility (AN admin)). ActiveNet is also used by Parks & Rec staff to book locations undergoing maintenance by Parks & Rec laborers.
    - By completing the Application themselves with the support of Parks & Rec staff (Facility (AN w/admin)).
- Vendor Application: Vendor applications are supplemental forms that are submitted for events held on City property/streets when vendors will be present. These applications are used in addition to the Event and/or Facility Application. For events held at private properties, no Vendor application is required as the City does not control or manage events in these situations.

In collecting quantitative data for events, detailed in "Quantitative Data", available applications were reviewed. A review of applications completed revealed that across the 50 events, 46 applications were submitted, with six providing no applications and no applications on file for 12. The total number of applications exceeds the total number of events due to overlaps in applications received; for example, a single event can complete Event, Facility, and Vendor Applications, or a single event can complete only Event and Vendor Applications.

A variety of application completion practices were observed and are shown in Figure 16. The largest number of submissions for a single type of application was for Special Event Applications, with all but one submitted to the Special Events Coordinator. Facility Applications were largely submitted in combination with the other application types, Event and Vendor. Applications were submitted almost equally between the two intake points, or City Point of Contact: 25 to Parks & Rec staff, 24 to the Special Events Coordinator, and 1 to both. These practices are discussed below with the intent of presenting the complexity of the City's application process. Simplification of this process prior to implementation of food waste and recycling collection programs for events would increase the success of programs.

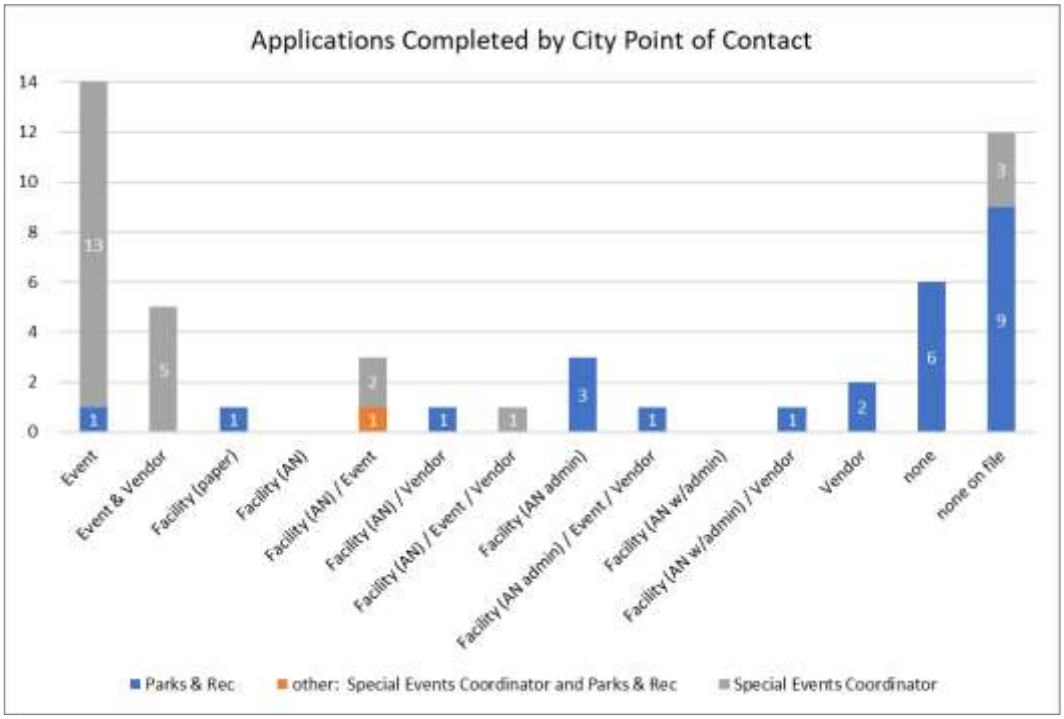


Figure 16. Applications Completed by City Point of Contact. The left axis represents the application count. Blue represents applications completed by Parks & Rec staff, grey by the Special Events Coordinator, and orange by both.

1. APPLICATION INTAKE

The Special Events Coordinator handles most large events, those considered special events, or those the Coordinator has historically handled. The Coordinator sits in the Mayor's office and also serves as the Mayor's Confidential Secretary. The Coordinator can receive Event and Vendor applications by email, mail, or in person.

Parks & Rec staff handle applications related to Department buildings and parks, some large events like O+ Festival, and other events it has historically handled. The Department has three applications: one dedicated application for the Everette Hodge Community Center only; one for the Andy Murphy Neighborhood Center, Rondout Neighborhood Center, Hasbrouck Stone Building, Forsyth Nature Center Gazebo; and one for pavilions at the following parks: Rotary Park at Kingston Point, Loughran Park, and Kingston Point Beach. These pavilions, as well as the balance of City park pavilions, can be rented via the ActiveNet online application system. Additional background on ActiveNet is provided later in this Study in "ActiveNet".

Applications are not collected for all events. For example, organizers of events held at Dietz Stadium typically only complete the checklist portion of the Special Event Application applicable to their needs, such as special requests for traffic cones or vendor applications. Events hosted by the Parks & Rec with no vendors, such as Kingston Clean Sweep, do not complete an Events Application; in such cases Parks & Rec takes responsibility for coordinating all aspects of an event.

The application intake process can follow different paths. Event applicants may start with a Special Event Application submitted to the Special Events Coordinator and then be directed to Parks & Rec staff or ActiveNet for completion of a Facility Application. In situations where the event is larger and requires it being raised to the level of City-wide coordination, such as coordination between the Mayor's Office, Kingston Police Department, and the City Clerk's office, completion of a Facility Application ensures that the site managed through the Facility application process is not double booked. Some larger event applicants may begin with ActiveNet for an event that should be processed

by the Special Events Coordinator; ActiveNet will direct these applicants to the Special Event Application process.

The City's primary point of contact with vendors is for licensing, insurance, and health department permit status. Private event hosts and vendors on City property/streets are required to provide proof of insurance meeting the City's insurance requirements. Events not submitting an application may not be providing the required insurance documentation.

The event organizer typically discusses how waste should be managed with the City point of contact. Waste is collected by Parks & Rec laborers if applications are handled by Parks & Rec staff. For other events where waste collection is requested, DPW laborers provide waste collection as well as handle tote rentals for recycling and refuse.

1.1. ActiveNet

ActiveNet is short for ACTIVE Network,[117] an activity and participant management software program that serves races and events, camps and classes, as well as parks and recreation program management using a SaaS technology platform,[118] a cloud-based program. This platform is currently only used by Parks & Rec staff, but interfaces in a limited manner with some of the other City departments involved in events organizing and management.

According to the City's Sustainability Coordinator, ActiveNet has a number of functionalities that Parks & Rec staff has found useful. Among other features, ActiveNet sends forms to event applicants, provides applicants with online signature authorization, and provides the applicant with the permit authorizing their use of the requested facility on a specific day and period of time. When an applicant's email is included in ActiveNet, City staff can communicate with the applicant via the platform's email function. ActiveNet also notifies pre-identified City staff of newly submitted applications via an automated email. If an event applicant needs support completing ActiveNet, Parks & Rec staff can complete the application on the applicant's behalf. In these situations, additional interactions with the applicant may be needed if no email is available for the applicant.

2. APPLICATION FEES

The application fees associated with the three different types of applications are detailed below.

2.1. Special Event Application

The application fee associated with the Special Event Application is $25. This fee is charged whether the full application is being submitted or if the event applicant is only applying for a specific event need, such as a parade, block party, parking restriction, street closures, etc. Applicants are required to provide both refuse and recycling receptables for events where refuse is generated. Totes for refuse or recycling are available for $20 per tote from the City; no deposit is required.

[117] "Our Story", ACTIVE Network, https://www.activenetwork.com/our-story. Accessed March 22, 2022.

[118] "What is SaaS?", Software Advice, https://www.softwareadvice.com/resources/saas-10-faqs-software-service/. Accessed March 22, 2022.

Additional fees may be charged for personnel associated with police presence, DPW staff, and City personnel. Parking fees are also charged for events requiring suspension of regulations for on-street and off-street parking, metered and non-metered. Street closure applications pay for the implementation of a detour plan depending on the size of the detour. These fees are listed on the Special Event Application Instructions page as well some of the other specific application sections.

The Special Event Application is available in paper format. The Vendor Application is attached to the Special Event Application.

2.2. Facility Application

Event applicants interested in renting Parks & Rec facilities have access to three applications; costs specific to the different applications are bulleted below. Waste removal fees for all Parks & Rec facilities are $100. Users that opt to carry-in/carry-out refuse and recycling incur no refuse removal fee but are informed that the City will charge a minimum of $200 if they are found to be non-compliant. Parks staff estimate that only 15% of pavilion users opting to carry-in/carry-out are non-compliant, although enforcing the non-compliance fee has proved to be difficult. Parks & Rec receives approximately $1,000 annually from refuse removal fees paid by applicants.[119]

- The Everette Hodge Community Center Facility Application has no rental fee; a $25 refundable key deposit is required. Event applicants are required to clean all areas used by the program at the end of each session. The Application notes that failure to comply will result in a $50 per hour cleaning fee.
- The rental fee structure for the Facility Application for all pavilions, Andy Murphy and Rondout Neighborhood Centers, Hasbrouck Stone Building, and Forsyth Nature Center Gazebo ranges from $65 to $300 per location, with some fees higher during weekends/holidays and for non-residents. Maintenance fees at the Andy Murphy and Rondout Neighborhood Centers are $55 per hour per staff person, with a minimum of three hours charged; these facilities require at least one staff member be present for the duration of the rental. A $100 fee is charged for the Hasbrouck Stone Building if the building key is not returned within one business day.
- Event applicants can use the online application system, ActiveNet, for all Parks & Rec facilities. A transaction fee of 6.9% in addition to the rental fee is charged to event applicants who complete an application via ActiveNet. ActiveNet applications completed by Parks & Rec staff on behalf of the event applicant incur no transaction fee and are logged in as administrative (Facility (AN admin)). ActiveNet bookings made internally by staff for Parks & Rec laborers' maintenance have no fee and are nonbillable.

2.3. Vendor Application

The Vendor Application fee is $40 and must be submitted for each individual vendor. Vendors possessing a current, Annual City of Kingston Vending License are not required to pay the fee. The Vendor Application is available in paper format and is attached to the Special Event Application.

[119] Environmental Education and Sustainability Coordinator Julie Noble email communication with former Parks & Rec Clerk Lisa Bruck, December 6, 2019.

4. FOOD WASTE PROCESSING

The food waste processing section includes information on site visits made to facilities that could process the City's food waste, interviews with hauling companies that could collect the City's food waste, technologies available for composting food waste, the analysis of locations potentially viable for a City-operated composting facility, and compostable product options.

A. COMPOSTING FACILITY SITE VISITS

Five site visits were conducted as part of this study: three to existing composting facilities within Ulster County, one to a small-scale food scrap recycling program in a Westchester County community, and one to the City of Kingston transfer station to assess its viability as a City-operated composting facility. Background information on the site visited as well as the assessment of the site offerings is found in this Study. Additional background as well as site visit photographs are found in Appendix D. Site Visits.

A.1. RECOMMENDATIONS FROM COMPOSTING FACILITY SITE VISITS

- **The City should carefully consider selection of a local facility to process its food waste.** As part of this Study, the Kingston Transfer Station and other potential City properties were determined to be inappropriate for a municipally managed composting facility. Three composting facilities are operational in Ulster County within reasonable traveling distance to the City. Previously concerned with high contamination rates, the closest at approximately 9.4 miles round trip, UCRRA, had not been an option; currently, UCRRA has indicated an interest in accepting the City's food waste and charges $20/ton for food waste, a price noted for commercial source separate food waste. UCRRA's compost is marketed to meet the US Composting Council's STA, is STA Certified; UCRRA accepts BPI compostable products. The next closest facility at 25.13 roundtrip miles is the Town of New Paltz Zero Waste Program facility, which charges $40/ton of food waste and permits products labeled compostable. The last facility, Greenway Environmental Services, located 40.53 miles roundtrip, also charges $40/ton; Greenway prefers to not take any compostable plastics, but will accept PLA compostable serving ware if needed. A contractual relationship with any composting facility should clearly outline what will be prohibited by the facility to ensure that the City is not detrimentally impacted by unexpected contamination fees.
- **The City should consider unveiling a food waste drop-off program and pilot curbside food waste collection program.** The operators of the Village of Scarsdale's Food Scrap Recycling Program firmly place their program's success in a consistent, multipoint education and outreach program that can only be successfully implemented through incremental food waste collection roll-out. Good integration with Village staff and a committed volunteer group are also key to the Village's success as this capacity allows for program participants to be properly informed of expectations. The Village is one of the few municipalities from which UCRRA accepts food waste, which is a testament to the Village's success.
- **The City should consider bulk purchasing residential composting kits that can be sold at cost to the City's residential food waste curbside collection program.** The Village of Scarsdale Program operator recommends providing residents with kits to make their integration and participation in the program easy. Doing so is also beneficial, in particular, with regards to bin liners to ensure that the product purchased, in this case given the Village's relationship with

UCRRA, is BPI certified. Residents are likely to purchase liners that claim to be compostable but are not given the lack of regulation around the compostable claim.

A.2. ULSTER COUNTY RESOURCE RECOVERY AGENCY

The site visit to the Ulster County Resource Recovery Agency (UCRRA)[120] composting operation, located at 999 Flatbush Rd, Kingston, NY 12401 (parcel number 40.17-1-15.210), was conducted on September 11, 2018. At the time of the site visit, UCRRA's hours of operation for public access was Fridays 9am to 1pm and Saturdays 8am to 3pm. The site visit was conducted to gain an understanding of UCRRA's Extended Aerated Static Pile (EASP) composting operation as a means of informing the City's ability to replicate this operation at a City-owned location. The information from the site visit was gathered as part of a Sustainable Materials Management Tour sponsored by the Syracuse University Center for Sustainable Community Solutions and New York State Association for Reduction, Reuse, & Recycling (NYSAR3). The tour was led by UCRRA Director of Operations & Compliance Charlie Whittaker. Additional information on the EASP composting operation was provided by former UCRRA Executive Director Timothy Rose and Director of Sustainability Angelina Brandt[121] through email communications from March 6 – April 9, 2020. Additional content was also incorporated from Ms. Brandt's presentation, "Small Scale Compost Facility Development"[122], at the 2019 NYS Organics Summit on March 27, 2019. UCRRA is located approximately 9.4 miles roundtrip from Kingston City Hall.

1. ASSESSMENT

UCRRA's EASP system is a low-cost, well-maintained composting operation that enables UCRRA to manage up to 2,500 wet tons annually on a 2.86-acre footprint. UCRRA's operation, which began with a pilot in 2012, was financially sustainable as of time of the tour. UCRRA has determined that it must maintain a low contamination rate to retain the high quality of compost currently produced; at the time of the tour, only select municipalities were determined to meet UCRRA's low contamination rate standards. Food scraps generators acceptable to UCRRA must be able to meet the key elements for programmatic success as identified by UCRRA. These elements for success are also considered industry best practices. Specifically, successful programs have:

- Strong, consistent leadership. Leadership retains ongoing relationships with and commitment to all stakeholders involved, throughout the collection community from point of generation (residents), to point of collection (drop-off sites), to point of transportation (haulers).
- A clear chain-of-command or process for accountability for dealing with any contamination issues. For example, "Is it the driver/hauler's responsibility to make sure the loads are clean? Is it the collection point's responsibility (drop-off site, lunchroom, etc.)? Or is it the supervisor of the team that initiated the program?".
- A programmatic strategy to launch a robust initial education/training process AND demonstrate some type of ongoing educational/engagement process for adding/training new participants or relaying feedback to participants.

[120] Ulster County Resource Recovery Agency, https://ucrra.org/. Accessed March 14, 2023.

[121] At the time of the site visit, Angelina Brandt served as UCRRA's Recycling Coordinator and was known by her maiden name, Peone.

[122] Angelina Peone, "Small Scale Compost Facility Development", presented at the 2019 NYS Organics Summit, https://drive.google.com/file/d/1ok__2vKWtSF9PrSVM50di0U1cepHMXU2/view. Other presentations from the summit are available here: https://www.nysar3.org/page/2019-summit-presentations-166.html.

- Frequent communication with the end user (compost site, UCRRA, etc.) including facility tours or meetings for all stakeholders involved.
- A variety of visual cues at the point of collection such as posters, signs, bin labels, color coded bins, flyers, etc.

2. EASP COMPOSTING OPERATION

UCRRA's EASP composting operation is a NYS DEC registered composting facility permitted to accept greater than 5,000 cubic yards of source-separated organic waste (SSOW), or greater than 2,500 wet tons per year. UCRRA is also permitted to accept greater than 10,000 cubic yards of yard trimmings per year, much of which is used for its composting operation. The EASP system was developed with guidance from O_2Compost,[123] a well-regarded company that provides custom compost system design and operator training. The EASP system was selected due to its low-maintenance requirements, with minimal staffing needs. Odor complaints from neighboring properties were reported to be minimal, although occasionally received from Thruway tollbooth employees. UCRRA estimates its composting environmental and economic impact since the inception of its composting program in 2012 as follows:[124] diversion of 279 tractor trailers from the landfill, equal to 9,762 tons of food waste; avoidance of 26,505 gallons of diesel fuel used for food waste transport; cost avoidance[125] of $951,076; and reduction in greenhouses by 270 MTC_2Oe.[126]

UCRRA's finished compost is sampled and tested once per quarter by the US Composting Council's STA Certified Composting Program and is STA certified.[127] Compost receiving this certification meets specified requirements for pH, soluble salts, nutrient content, moisture content, pathogen presence, and trace metals presence, among other properties analyzed.[128] Finished compost is typically purchased by private individuals and landscapers, the latter purchasing in large quantities, in the fall and spring. UCRRA anticipates selling finished compost to Lowe's and Adams Fairacre Farms with the purchase of a bagger. UCRRA's finished compost, marketed as Grow Ulster Green Compost, is currently sold at $30 per ton, or a minimum of $20 per load. The disposal fee for food waste is noted as $20/ton from commercial sources only and for yard waste is $40/ton.[129] During the tour, UCRRA's composting operation was noted to be financially self-sustaining.

A.3. VILLAGE OF SCARSDALE FOOD SCRAP RECYCLING PROGRAM

The site visit to the Scarsdale Food Scrap Recycling Program[130] composting operation, located at Scarsdale Recycling Center, 110 Secor Road, Scarsdale, NY 10583, was conducted on December 17,

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[123] "O2Compost".

[124] 2019 NYS Organics Summit, *Small Scale Compost Facility Development*, March 27, 2019. https://drive.google.com/file/d/1ok__2vKWtSF9PrSVM50di0U1cepHMXU2/view

[125] Cost avoidance includes monies not spent on transportation of food waste to landfill and disposal costs.

[126] $MTCO_2e$ refers to metric tons of carbon dioxide equivalent, which the US Environmental Protection Agency defines as "the number of metric tons in CO2 emissions with the same global warming potential as one metric ton of another greenhouse gas".

[127] "Compost for Sale", UCRRA.

[128] "Seal of Testing Assurance (STA)", US Composting Council.

[129] "Fee Schedule", UCRRA.

[130] "Food Scrap Recycling / Food Scrap Composing", Village of Scarsdale, https://www.scarsdale.com/495/Food-Scrap-Recycling.

2018. At the time of the site visit, the Program's hours of operation for public access was Monday through Saturday 8am – 3pm. The site visit was conducted to gain an understanding of Scarsdale's food waste drop-off program as a means of informing the City's ability to replicate this operation. The tour of the facility was provided by Michelle Sterling, Scarsdale Conservation Advisory Council (SCAC) Chair; Ron Schulhof, Scarsdale CAC appointed member; and Benedict Salanitro, former Public Works Superintendent. Timothy Rose, former UCRRA Executive Director; Melinda France, former UCRRA Recycling Educator; Carla Castillo, from HVRC, and Julie Noble, City of Kingston Sustainability Coordinator attended. Additional information was collected from a phone interview with Sterling and Schulhof on February 25, 2020, as well as Village of Scarsdale Sanitation[131] webpages, including the Food Scrap Recycling / Food Scrap Composting webpage.

1. ASSESSMENT

The Village of Scarsdale created a successful Food Scrap Recycling Program in full cooperation with the SCAC. The Village's model fully integrated the Program into the services provided by Village Public Works. The Scarsdale CAC conducted intensive product research and incorporated resident feedback important to the successful final Program design. The Program design included a strong education and engagement component, supported heavily by Scarsdale CAC members and volunteers, but also by Public Works staff. This important component has resulted in a low contamination rate, enabling Scarsdale to send collected food scraps to UCRRA. The Program has become such a positive part of Scarsdale life that some real estate agents provide starter kits as housewarming gifts for new homeowners. Scarsdale's Program has also served as inspiration to neighboring communities, such as the City of Rye, which used a $5,000 award from the NYSERDA Clean Energy Communities Program to develop its food scraps recycling pilot program. The Scarsdale CAC strongly recommends that any composting program begin with a drop-off program prior to moving to curbside collection.

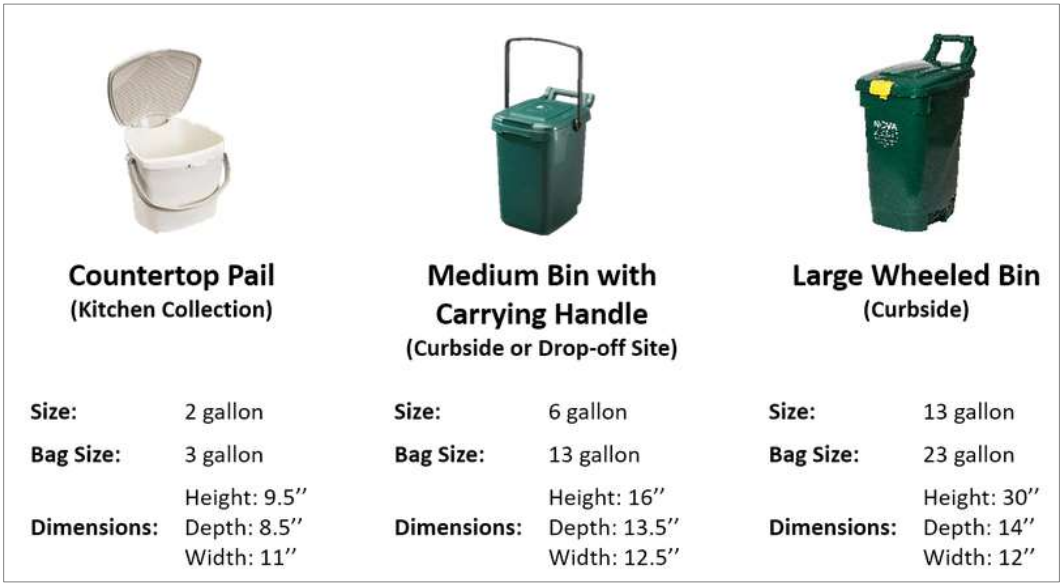

Figure 17. Three bin types available for purchase by registered participants in Scarsdale Food Scrap Recycling Program. Participants are free to use any type of countertop pail, but must use either the medium bin or wheeled bin for curbside collection. (Source: Food Scrap Recycling / Food Scrap Composting webpage.)

2. PROGRAM DESCRIPTION

The Village of Scarsdale Food Scrap Recycling Program provides both curbside residential collection as well as food scraps drop-off at the Scarsdale Recycling Center. Participation in either curbside collection or drop-off requires registration.

[131] "Sanitation", Village of Scarsdale, https://www.scarsdale.com/170/Sanitation. Accessed March 14, 2023.

Participation is voluntary. The Village charges no fee for either service. Residents participating in the curbside program may also take food waste to the drop-off location. In the first year of the Program, 1,000 homes registered to participate.[132] The Program hosts a compost give back day three times a year. Compost is provided for free to participants and nonparticipants. The Village pays for the finished compost from UCRRA.

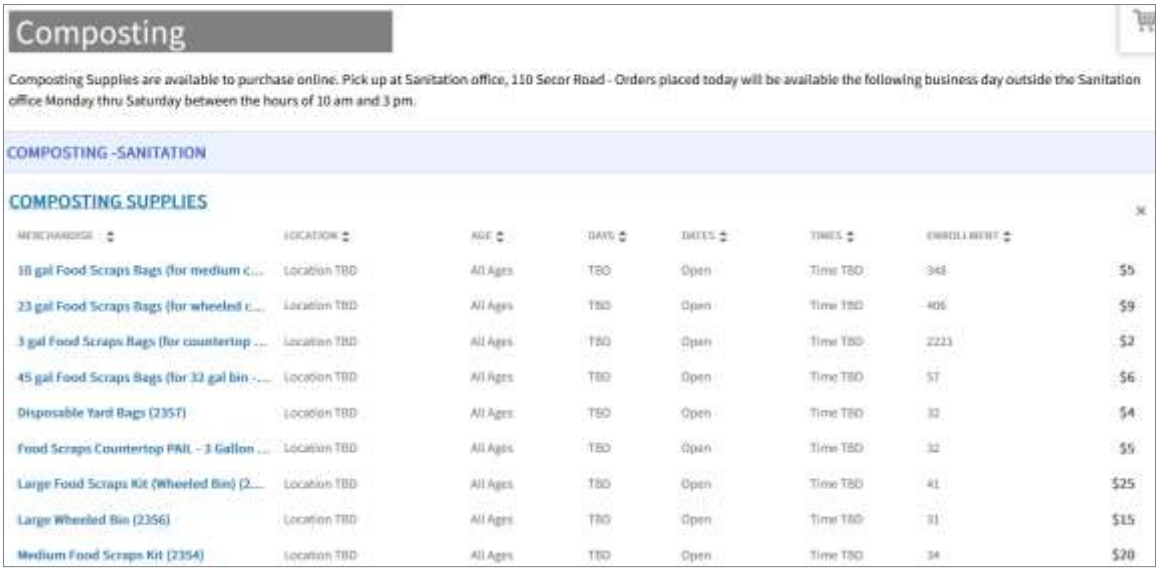

Figure 18: Scarsdale's online portal where supplies for participation in the Village's Food Scrap Recycling Program can be purchased. All orders are made available at the Sanitation Office located in the Recycling Center. (Source: Village online portal.)

The Scarsdale Food Scrap Recycling / Food Scrap Composting webpage notes that "[a] Village-approved bin, as depicted below (center or right image), must be used for the curbside food scrap pickup service" (see Figure 17). The Village offers starter kits and compostable bags for newly registered participants. Both starter kits include the countertop pail and a roll of compostable bags. The medium-sized starter kit also includes the medium 6-gallon bin and costs $20; the large-sized starter kit includes the 13-gallon wheeled bin and costs $25. Compostable bags are available for purchase at the Recycling Center or on the Village's online portal[133] (see Figure 18) and are sold at cost. Registered residents may put out multiple, approved curbside bins. Registered residents using only the drop-off location may not have any financial obligation if using collection containers, such as large yogurt containers or five-gallon containers.

2.1. Program Development History

The Food Scrap Recycling Program was developed as a partnership between the Village of Scarsdale Public Works and the Scarsdale CAC.[134] Scarsdale CAC Chair Michelle Sterling and appointed member Ron Schulhof spearheaded the effort. The Scarsdale CAC consists of nine appointed members plus summer college students and additional volunteers who participate on an as available basis.

[132] According to the US Census, the Village had 5,590 households for the 2014-2018 period. Residents do not pay for trash separately.

[133] "Composting Supplies Catalog", Village of Scarsdale, https://secure.rec1.com/NY/village-of-scarsdale-ny/catalog.

[134] No concerns were raised by the Public Works union; Public Works staff welcomed the support of Scarsdale CAC and volunteers.

In development of the Program, close attention was paid to resident engagement, DPW logistics, and cost. The Program was adopted unanimously by Scarsdale's six-member Board of Trustees; cost savings were not an important motivator as they were not anticipated to be significant.

Compostable bin liners for both the countertop pail and curbside bins were not originally offered when the Program began. Resident feedback indicated the importance of incorporating them into the Program offerings.

The Scarsdale CAC attempted to promote backyard composting. The significant outreach effort resulted in little interest or participation. The Scarsdale CAC found that most residents were not interested in backyard composting.

Drop-off site collection totes selected were originally 32-gallon. The Program moved to 64-gallon totes when the smaller totes filled too quickly. A dumpster was not used for collection due to difficulty with cleaning and odor issues. Curbside bins were originally sized at 32-gallon but were found to be too large for food waste alone.[135] The six- and 13-gallon bins were found to be useable by all registered residents; 13-gallon bins were found to be sufficiently large for a typical family.

Initially Scarsdale CAC members as well as volunteers were trained to respond to Program registrants' questions and to discuss and address contamination issues. The low contamination culture of the Program is now understood, with minimal education now needed.

The curbside Program originally started with a private hauler, but moved twice weekly to municipal curbside collection. Initially, municipal collection was completed with a retrofitted pick-up truck that collected approximately 30% of the route; available equipment allowed for retrofitting at no cost for parts. Public Works staff, including sanitation laborers, were trained; all were open to the Program. Scarsdale CAC research of haulers used for municipal food scraps collection nation-wide revealed 25 cubic yard haulers as the typical size used.

2.2. Education & Engagement

Sterling and Schulhof credit a strong engagement and education component for the Program's success for both drop-off and curbside collection as well as low contamination rate – less than one percent. Because the Program is only available to registered residents, registration becomes a point of engagement and education. Residents typically register for the Program at the Sanitation office located at the Scarsdale Recycling Center as well as through tabling opportunities at various events. Scarsdale CAC members and trained volunteers engage with Scarsdale residents at events on a variety of programming supported by the CAC and use this opportunity to register residents in the Program. Typical events and venues where the Program is promoted include schools, houses of worship, Junior League, voter clubs, and Rotary International Club. The local library provides display space on the Program. Houses of worship attendees were found to be very receptive to the Program.

Registration includes a Program education component, with relevant Program material provided with the purchase of starter kits or curbside bins and compostable bags. The sale of compostable bags by

[135] Scarsdale CAC's research found that the Cambridge, MA curbside program used a 32-gallon curbside tote as that program commingled food and yard waste.

Village staff is also used as a point of Program engagement and education.[136] Resident questions are answered by Public Works staff on-site.

The Village pays for all printed materials used for the Program. Printed materials are designed at no cost by Scarsdale CAC members with graphic design experience. The Village has also paid for bin stickers and signage.

2.3. Residential Food Scraps Collection Bins

Scarsdale CAC tested many bins and compostable bin liners before finalizing the selected items listed on the Scarsdale's online portal. Resident input during Program development resulted in the incorporation of bin liners into the Program, to be sold by the Village. Scarsdale CAC's research revealed that the complexity of bin liners available for purchase at retail stores would likely result in the use of bags that were not compostable.[137] Bins and compostable bin liners are purchased in bulk and sold at cost to registered residents.[138] The Village purchases a three-month supply of compostable bin liners because liners have a shelf life of one to three years.

- Two types of bins were considered: kitchen countertop and curbside. The deciding factors in final selection bins were bin strength, thick walls, durability, strength of seal when bin closed, strength of closure mechanism (animal lock), sealed tip bar, and transportability when full. Both bins incorporate accepted food scraps, hot-stamped for bins and stickers for countertop pails (see Figure 17). Sure-Close[139] is the countertop pail selected; EcoSafe[140] offer the 6- and 13-gallon selection.
- Bin liners were chosen from the selection of certified compostable bags listed on BPI's website[141]. The bin liners selected, Natur-Bag[142] (see Figure 18), were determined to be of the greatest strength and tear-resistance for the price. Natur-Bag compostable liners are BPI certified.[143]

[136] Public Works staff also provide kits and take payment from Program participants when Scarsdale CAC volunteers are not available to do so.

[137] The 2019 PBS article, "How biodegradable plastic bags don't live up to their name", offers a good explanation of the complexity of products available to consumers. The terms biodegradable and compostable are loosely applied without true consideration to how the materials decay. Vegware (https://www.vegwareus.com/us/)sells plant-based products designed to be commercially compostable with food scraps. Bioplastics, such as those sold by Vegware, use plants like corn starch, tapioca roots, or sugarcane as raw materials in the production of Polylactic Acid (PLA). "PLA Plastic/Material: The Ultimate Guide" offers a comprehensive explanation of PLA (https://all3dp.com/2/what-is-pla-plastic-material-properties/).

[138] The Village bulk purchase of liners costs $2/roll compared with $5/roll for a similar product at a local supermarket.

[139] "SureClose", SureClose, 2010, http://www.sure-close.com/index.html.

[140] "Bins", EcoSafe, https://ecosafe.green/bins/. Accessed March 14, 2023

[141] "Products", BPI World, https://products.bpiworld.org/?search=&category=26&type=2. Accessed March 14, 2023

[142] "Compostable Bags and Liners", NaturBag, https://naturbag.com/bags/. Accessed March 14, 2023.

[143] Ulster County Resource Recovery Agency only accepts use of BPI certified products that meet the US American Society for Testing and Materials (ASTM) Standards D6400. According to the US EPA webpage on Frequently Asked Questions about Plastic Recycling and Composting, the decomposition of compostable materials meeting the ASTM Standards D6400 "must occur at a rate similar to the other elements of the material being composted (within 6 months) and leave no toxic residue that would adversely impact the ability of the finished compost to support plant growth" (https://www.epa.gov/trash-free-waters/frequently-asked-questions-about-plastic-recycling-and-composting).

3. SITE DESCRIPTION

The Scarsdale Recycling Center offers the below-listed waste management services to Scarsdale residents on a drop-off basis. Images for the below-listed services appear in "Site Visit Images". Information on the specific offerings at the Recycling Center are found on the Village's website.[144] (Yard waste, which is collected curbside, is mulched on-site in an area separate from the drop-off area.)

- Food scraps drop-off site for registered residents.
- Take It or Leave It area where residents can give away usable items or take items left by someone else. Typical items include toys, bicycles, and gardening equipment.
- Furniture Donation Bin that accepts small household items and used furniture in good condition for distribution by a Westchester County nonprofit to those in need throughout the County.
- Sanitation Center information and assistance booth, staffed.
- Clean clothes, blankets, towels, and shoes are accepted at the Textile Recycling Binny Box. Since 2016, 58.43 tons of textiles and shoes have been diverted from the landfill.
- A wide variety of electronic waste can be deposited at the E-Waste Recycling Bin.
- The Cooking Oil Recycling bin accepts all liquid food oils.
- Scrap metal recycling.

3.1. Food Scraps Drop-Off Operation and Costs

Operational procedures for the food scraps drop-off program are as follows. Please refer to the section "Site Images".

- The drop off site is clearly labeled with a large sign that also lists the acceptable food scraps items (Figure 21). Additional items that are also accepted include oily materials, rotten food, tissues, napkins, paper towels, and hair.
- 64-gallon totes at the front are available to registered residents for drop-off of acceptable food scraps. Totes at rear are full and ready for collection by Sanitation staff. (See Figure 22.)
- Participants dropping off food waste will drop off bag-free or in small compostable bags (Figure 25).
- A cleaning station is located next to the drop-off area, enabling registered residents to return home with a rinsed collection bin (Figure 24).
- Totes at drop-off site are lined with compostable bags and held in place by large rubber bands. Most rubber bands are removed as bags are placed into Sanitation truck. (See Figure 25.)
- Drop-off collection totes are cleaned out with natural ammonia after each emptying (Figure 28).

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[144] "Sanitation", Village of Scarsdale, https://www.scarsdale.com/170/Sanitation. Accessed March 14, 2023.

"Take it or Leave it Shed", Village of Scarsdale, https://www.scarsdale.com/657/Take-It-or-Leave-It. Accessed March 14, 2023.

"Furniture Donation Bin", Village of Scarsdale, https://www.scarsdale.com/564/Furniture-Donation-Bin-at-Recycling-Cent. Accessed March 14, 2023.

"Textile Recycling", Village of Scarsdale, https://www.scarsdale.com/176/Textile-Recycling. Accessed March 14, 2023.

"Electronic Waste", Village of Scarsdale, https://www.scarsdale.com/175/Electronic-Waste. Accessed March 14, 2023.

"Cooking Oil Recycling", Village of Scarsdale, https://www.scarsdale.com/827/Cooking-Oil-Recycling. Accessed March 14, 2023.

- The Sanitation building located on site is open to registered residents for purchase of additional bins, compostable bags, and program registration.

Former Public Works Superintendent Benedict Salanitro explained tonnage collection patterns. On a weekly basis, 30% of the 6,667 pounds of food scraps collected were from drop-offs while 70% were from curbside collection. Collection drops were observed in the summer, with the fall seeing a large increase in pumpkins, which are separated out because they take up a lot of space. Salanitro noted that the Program resulted in the hire of one additional part-time employee.

Initial one-time start-up, annual operating, and reimbursed ongoing costs are outlined in Table 28. Scarsdale Food Scraps Recycling Program. Reimbursed outlays are purchased in bulk by the Village and sold to registered residents at cost. Registration payments at events are taken in cash or by checks made payable to the Village. The Scarsdale CAC transfers cash registrations to a check made payable to the Village. The Scarsdale CAC checks inventory every few months and provides Public Works staff with a list of needed products; inventory checks include tracking of kits sales at events and venues.

Table 28. Scarsdale Food Scraps Recycling Program

Cost	Drop-Off Start-Up Expenses (one-time)
$400	Large drop-off sign (Figure 21).
$2,500	20 64-gallon collection totes at $125/tote.
$2,900	**Total Drop-off Start-up Expenses**

Cost	Operating Expenses (annual)
$4,800	Weekly collection and hauling.
$500	Annual cost for compostable liners for totes.
$500	Outreach and publicity.
$5,800	**Total Operating Expenses**

Cost	Reimbursed Outlays
$2,000	Starter kit: countertop pail, 400 count at $5 each.
$4,800	Starter kit: 6-gallon bin, 400 count at $11-13 each.
$6,000	Starter Kit: 13-gallon bin, 400 count at $15 each.
$200	Starter kit: guide, 400 count at $0.50 each
$800	Starter kit: roll of compostable bags, 400 count at $2 each.
	Compostable 3-gallon bags, as needed. Sold for $2 for roll of 25.
	Compostable 13-gallon bags, as needed. Sold for $5 for roll of 25.
	Compostable 23-gallon bags, as needed. Sold for $9 for roll of 25.
$13,800	**Total Reimbursed Outlays**

2018 Program costs were approximately $70/ton, consisting of a $20/ton tipping fee paid to UCRRA plus $50/ton to manage the Program and for transport to UCRRA. Scarsdale refuse is delivered to the Charles Point Resource Recovery Facility in Peekskill, a waste-to-energy facility known as Wheelabrator

Westchester.[145] The refuse disposal cost at Wheelabrator is paid for through County taxes.[146] Since Program inception, refuse tonnages have reduced from 10,000 tons to 6,500 tons. Cost savings from tonnage reductions have been absorbed into Public Work's operating budget.

4. SCARSDALE CURBSIDE COLLECTION

Refuse and recycling for Scarsdale residents prior to the institution of curbside composting collection typically was collected from the back of garages or driveways. Residents registered in the Program were required to place the food waste container directly at the curbside.

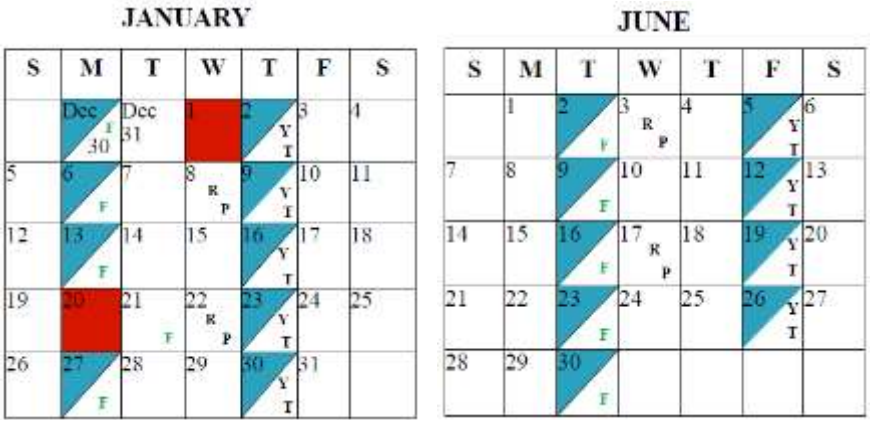

Figure 19. The January collection at left is for the Monday/Thursday schedule. The June collection at right is for the Tuesday/Friday schedule. Abbreviations: F is for food waste collection, R for commingled recycling, P for paper and cardboard, Y is for yard waste, and T is for bulky trash. Refuse is collected twice weekly for each schedule, both Monday and Thursday or Tuesday and Friday. (Source: Scarsdale Sanitation Collection Schedule.)

4.1. Curbside Collection Schedule

Scarsdale collects food scraps, refuse, and yard waste across four work-week days on a Monday/Thursday or Tuesday/Friday schedule. Apart from refuse, which is collected from a garage or other location adjacent to the residence, all other waste is collected curbside.

- Food scraps are collected weekly on Monday and Tuesday. Refuse is collected twice weekly for each schedule.[147] Food scraps collection bins must be placed curbside no later than 7:00am on the designated collection day. A single sanitation truck is able to collect the entire Monday route. Scarsdale has no split body rear loader sanitation trucks.
- Yard waste is collected year-round on a weekly basis on Thursdays and Fridays.
- All recycling is collected on Wednesdays, with the Monday/Thursday schedule recycling collected on the first and third Wednesdays, and the Tuesday/Friday schedule recycling collected on second and fourth Wednesdays. Scarsdale recycling is dual stream, with paper and cardboard collection separated from comingled plastic and glass.
- Sample 2020 schedules appear in Figure 19.[148]

[145] At the time of the site visit, Scarsdale was one of 36 communities in Westchester County Refuse Disposal District #1; these communities send refuse to the Wheelabrator Westchester (https://www.wtienergy.com/plant-locations/energy-from-waste/wheelabrator-westchester).

[146] Michael Risinit and Ned Rauch, "Counties can toss less trash to save more cash", LoHud, June 14, 2014. In 2014, Scarsdale paid for $27.09/ton of the $75.95/ton tipping fee charged by Wheelabrator.

[147] Long term, Public Works expects to be in the position to remove the second refuse collection day. Public Works will only do so if no reduction in service to the community is anticipated. 100% participation in the composting program would be required.

[148] Current schedules are available on the Village's "2023 Sanitation Collection Schedule" webpage, https://www.scarsdale.com/349/2023-Sanitation-Collection-Schedule . Accessed March 14, 2023.

The 2-page Scarsdale Recycling Guide[149] provides clear guidance on how to dispose of various types of waste.

Figure 20. The Scarsdale Recycling Guide. (Source: Scarsdale Public Works Sanitation webpage.)

5. FOOD SCRAPS COLLECTION PROGRAM RECOMMENDATIONS

Sterling and Schulhof evaluated their experiences with and learnings from the establishment of the Scarsdale Food Scraps Recycling Program. Their recommendations are bulleted below.

- Food scraps programs should begin with a drop-off site program for one year. Going straight to a full municipal curbside program would be difficult to implement given many unknowns. For example, with a municipality-wide implementation, the number of participants would be unknown, making routing decisions difficult. By beginning first with drop-off, registered participants are identified by location and number, allowing for assignment to a route when curbside is implemented. Additionally, registrations inform collection vehicle needs. Last, residents prefer certainty rather than changing collection schedules.
- Programmatic success is measured through waste diverted, low contamination rates, and resident attitudinal shift on the value of food waste.
- Volunteers were key to a strong education and engagement component. Volunteers can more easily manage education and engagement with a drop-off program.
- Low contamination rates are fostered through consistent messaging delivered at critical points of interaction, such as at the purchase of a food scrap recycling starter kit. Regardless of where residents purchase the kit, whether at an event or at the Sanitation office, everyone receives guidance on recommended composting practices.

[149] Village of Scarsdale, "Sanitation".

- The socio-economic composition of a community has no impact on the low contamination rates of food scraps collected. Locally relevant education and engagement determine a program's success.
- Existing rear loader sanitation trucks can be used for residential food scraps collection with the addition of a seal to prevent leakage. As collection from wet food waste increases, such as from restaurants, a fully sealed organics truck would be recommended.

6. SITE VISIT IMAGES

Images from the tour of the Scarsdale Food Scraps Program at the Scarsdale Recycling Center follow. Also included are photographs of other drop-off opportunities available to Scarsdale residents.

Figure 21. Signage listing acceptable food scraps. (Source: Carla Castillo.)

Figure 22. Totes organized at Food Scrap Drop-Off Site. Totes at right are available for drop-off of food scraps. Totes at rear are full and ready for collection by Sanitation staff. (Source: Carla Castillo.)

Figure 23. Collection of food waste from Drop-Off Site. (Source: Carla Castillo.)

Figure 24. Hose-off location for emptied bins and totes. (Source: Carla Castillo.)

Figure 25. Totes lined with compostable bags. Note rubber band, which is removed by DPW staff prior to placing full bags into sanitation truck. (Source: Carla Castillo.)

Figure 26. 6-gallon residential standing bin, far left, and 2-gallon kitchen countertop pail, left. Bins are hot-stamped and pails have stickers with list of acceptable food scraps items. (Source: Carla Castillo.)

Figure 27. Left, Scarsdale CAC Chair Michelle Sterling discussing two residential collection bins, 2-gallon countertop pail (held), and 13-gallon wheeled curbside bin. Right, Scarsdale CAC member Ron Schulhof standing next to 6-gallon carry bin. (Source: Carla Castillo.)

Figure 28. DPW staff cleaning drop-off totes after food scraps have been dumped into sanitation truck. (Source: Carla Castillo.)

Figure 29. Pallets of 13-gallon wheeled curbside bin shown as delivered. (Source: Carla Castillo.)

Figure 30. 3-gallon Nature-Bag compostable bags sold for 2-gallon bin and 13-gallon bag sold for 6-gallon carry bin. (Source: Carla Castillo.)

Figure 31. Take It or Leave It & Furniture Donation Bin stations. (Source: Carla Castillo.)

Figure 32. Acceptable items deposited at Take It or Leave It. (Source: Carla Castillo.)

Figure 33. Sanitation Center information & assistance booth. (Source: Carla Castillo.)

Figure 34. Textile Recycling Binny Box for clothes & shoes. (Source: Carla Castillo.)

Figure 35. Binny Box acceptable items for donation. (Source: Carla Castillo.)

Figure 36. Left, Furniture Donation Bin acceptable items. Right, Items in Furniture Donation Bin. (Source: Carla Castillo.)

Figure 37. Left, Furniture Donation Bin acceptable items. Right, Items in Furniture Donation Bin. (Source: Carla Castillo.)

Figure 38. Left, Metal Recycling collection bin. Right, Metal products dropped off. (Source: Carla Castillo.)

A.4. CITY OF KINGSTON TRANSFER STATION

The site visit to the City of Kingston Transfer Station,[150] located at 380 Boulevard Street, Kingston, NY 12401 (parcel number 56.48-2-13), was conducted on August 25, 2020. At the time of the site visit, the Transfer Station's hours of operation for public access were Fridays 9am to 1pm and Saturdays 8am to 3pm. The site visit was conducted to assess the feasibility of a portion of Transfer Station serving as on-site food waste recycling location for City food waste. The site visit was conducted Julie Noble, City of Kingston Sustainability Coordinator, and Carla Castillo, HVRC.

[150]"Recycling", City of Kingston, https://www.kingston-ny.gov/recycle. Accessed March 15, 2023.

1. ASSESSMENT

The area in the Transfer Station assessed for use as a food waste recycling site is limited by its size and location constraints, namely a 25-foot drop-off around three-quarters of the site. Additionally, residential properties are located in relatively close proximity to the site. Any onsite operation would require close management of odor and pests to prevent being a nuisance to these properties.

2. SITE DESCRIPTION

The City of Kingston Transfer Station is located on the southwestern section of the City, east of NYS Route 32 in Ward 3-3. The parcel is owned by the City of Kingston, has a property classification of solid waste, and has a total area measuring 8.6 acres. It is adjacent to the Ulster County Jail and Office of the Ulster County Sheriff. Jaffer Electric is located to the north off the Boulevard. Two nearby residential properties are located off Condie Street, Chapel Street, and Brook Street, ranging in 75 meters to 135 meters in distance from the parcel. Figures 39 and 40 provide aerial views of the Transfer Station in relation to surrounding land uses.

Figure 39. The City of Kingston Transfer Station in relation to nearby land uses. (Source: Google Maps, 2020 imagery.)

Figure 40. A parcel view of the City of Kingston Transfer Station in relation to nearby land uses. (Source: Google Maps, 2020 imagery.)

The Transfer Station is open to the public year-round on Fridays 9am to 1pm and Saturdays 8am to 3pm. The below listed waste is accepted at the Station; disposal costs are also shown.[151] All activities are supported by a loop road, Albert Street. Refuse, electronic waste, and recycling are collected in the collection bins located in the paved area in the southern end of the parcel. The weighmaster's office and scale sit across from the roadway from the collection area as well as a currently minimally used structure. See Figures 41 & 42.

- Bulk Refuse: $0.15 per pound.
- Electronic waste: no charge at Transfer Station.
- Recycling: no charge.
- Brush (Commercial): $30 per ton; $15 if less than one ton.

Figure 41. A parcel view of the Transfer Station with its associated activities. The location considered for food waste recycling is located in the northeastern portion of the parcel shown in Figure 43. (Source: Ulster County Parcel Viewer, 2016 aerial imagery.)

Figure 42. Refuse, electronic waste, and recycling collection area at left, with new recycling bins at center and far right. The weighmaster's office is at right. (Source: Carla Castillo.)

The area considered for food waste recycling is located in the northeastern portion of the Station (see Figure 40). The useable portion of the site, detail shown in Figure 43 below, measures approximately half an acre, using the Ulster County Parcel Viewer measurement tool. The usable portion is firm,

[151] The DPW Fee Schedule is available at "Kingston Recycles," City of Kingston, https://kingston-ny.gov/Recycle. Accessed March 14, 2023.

unimproved ground that is accessible to heavy equipment, consisting of compacted soil and old asphalt pieces. Heavy equipment typically used in this area includes a front loader and excavator.
This area is currently used for City collected yard waste, brush, and wood. Per the City of Kingston DPW Refuse/Recycling Information Calendar 2023[152], these materials are included as part of municipal collection April 27 thru October 30. Intermittently, leaf waste is sent to a separate vendor. UCRRA in the past has chipped wood and removed it for use at its EASP composting facility at no cost to the City.

The two-dimensional view shown in Figure 43 does not convey the site's limitations, foremost a 25-foot drop-off surrounding three-quarters of the area show, which impedes use of the balance of the parcel for food waste recycling. Figures 44-46 provide a clearer understanding of the site limitations; the limitations are noted in the figure descriptions.

Figure 43. Area of Transfer Station in blue polygon assessed for potential use as food waste recycling location. (Source: Ulster County Parcel Viewer, 2016 aerial imagery.)

Figure 44. Usable portion of site, looking toward waste collection areas and Ulster County Jail. Yard waste shown at left. Usable portion is firm, unimproved land accessible to heavy equipment. (Source: Carla Castillo.)

[152] "Refuse/Recycling Information Calendar 2023", City of Kingston DPW, https://kingston-ny.gov/filestorage/8463/13525/2023_Calendar_Refuse-Recycling.pdf. Accessed March 14, 2023.

Figure 45. Usable portion of site, looking north. The 25-foot drop-off begins where the tree line begins. (Source: Carla Castillo.)

Figure 46. 25-foot drop off, including soft, spongy surface in foreground that surrounds the usable portion of site. (Source: Carla Castillo.)

A.5. NEW PALTZ "ZERO WASTE PROGRAM"

The site visit to the Town of New Paltz Transfer Station,[153] located at 3 Clearwater Road, New Paltz, NY 12561 (parcel number 78.2-3-6), was conducted on August 25, 2020. At the time of the site visit, the Transfer Station's hours of operation for public access were Tuesday thru Saturday 9am to 4:30pm. The site visit was conducted to understand food waste recycling operation at the Transfer Station. The

[153] "Recycling/ReUse", Town of New Paltz, https://www.townofnewpaltz.org/recyclingreuse. Accessed March 14, 2023.

site visit tour was provided by Michael York and Lloyd Luckett. Additional information was provided by Laura Petit, Ulster County Legislator, District 8, on August 18, 2020.

1. ASSESSMENT

The composting operation at the New Paltz ReUse and Recycling Center is located on a site sufficient in size to manage current food waste deliveries. The Center would be currently able to accept food waste from a pilot program instituted by the City of Kingston. A cost savings of $70 per ton for tipping fees would accrue to the City, the difference between a tipping fee of $110 per ton paid at UCRRA and a $40 per ton tipping fee for food waste at the Center. The City already transports sewage sludge to the local UCRRA transfer station weekly. The Center is 11.4 miles one way from City Hall

2. PROGRAM DESCRIPTION

The Town of New Paltz operates its Zero Waste Program at the New Paltz Transfer Station, known as the New Paltz ReUse and Recycling Center. It is a NYS DEC registered residential facility that accepts a variety of waste and reusable materials from New Paltz residents, businesses, and contractors. Accepted items include recyclables, electronic waste,[154] yard waste, and refuse as well reusable materials like construction materials, household items, office and art materials, and electronics. The Center also runs a food recovery program and donates to food pantries when possible. The Town is currently exploring a ground-mounted solar installation on the closed landfill.

In 2019 the Center became a NYS DEC registered composting facility permitted for processing of up to 5,000 cubic yards or 3,000 tons annually of residential food waste. The composting program is available to New Paltz residents on a drop-off basis only. Food waste is also accepted from Ulster County municipalities at a cost of $40 per ton.[155] Royal Carting delivers food waste to the Center; the scale house at UCRRA transfer station is used. All food waste, proteins and produce, is accepted. All compost produced is used by the New Paltz Highway Department and sold in its entirety to largely residents and also landscaping companies, typically in the spring.

[154] Electronic waste is accepted only from New Paltz property taxpayers.

[155] The Town of New Paltz Recycling Center 2022 Fee Schedule provides fees associated with all materials accepted by the Center. “2022 Fee Schedule”, Town of New Paltz, https://www.townofnewpaltz.org/sites/g/files/vyhlif3541/f/uploads/recycling_fees_2022.pdf. Accessed March 14, 2023

Figures 47 thru 50 show portions of the Center's programming.

Figures 47 & 48. The image at left shows the various areas in use at the New Paltz ReUse and Recycling Center. The Town's now closed landfill appears in the lower right corner; the composting operation appears to the left. The use for the area incorrectly labeled New Paltz Town Hall is shown in the next image, Figure 48. (Source: Google Maps, 2020 imagery.) In the image at right, the Center office shown in center, with mulch and finished compost available for purchase in foreground. Also in the foreground and on the right are collection bins for various recyclable materials. In background on right beyond the collection bins are the buildings that house the food pantry program and store reusable materials available for purchase. (Source: Carla Castillo.)

Figures 49 & 50. Compost bin available for residential food waste drop-off, left. Kitchen food scraps collection bins available for sale and battery recycling station inside the office. (Source: Carla Castillo.)

3. SITE DESCRIPTION

The New Paltz ReUse and Recycling Center is owned by the Town and has a property classification of landfill. The composting operation is adjacent to the closed landfill and is down the road from an UCRRA transfer station. The current, active operation takes place in two adjacent sections of unimproved land separated by an access road for the landfill. The area on the left measures approximately 0.85 acres and is used for active composting. The area on the right measures approximately 0.69 acres is used as the processing area for browns, or carbon source, added to the food waste. The combined composting operation area is approximately 1.54 acres (see Figure 51). The area is not used in its entirety, but allows ample room for movement of heavy equipment. The nearest residential property is located 478 meters from the active composting area on the left. (Composting area measurements were taken using the Ulster County Parcel Viewer measurement tool.)

Figure 51. Areas used for composting operation at New Paltz ReUse and Recycling Center. (Source: Ulster County Parcel Viewer, 2016 aerial imagery.)

4. COMPOST FACILITY OPERATION

Michael York manages the Center's composting operation along with other management responsibilities related to the various activities and programming at the Center. Lloyd Luckett interacts with the public and tracks expenditures associated with the operation. Mr. York has found contamination to be common regardless of food waste source. Finished compost is used by the Town's Highway Department to create a topsoil product that is used throughout the Town. Odor from the site was minimal and only noticeable when next to a composting pile. No birds or flies were present.

4.1. Equipment

Mr. York uses the below-listed equipment for production of finished compost. The purpose of the equipment and associated purchase price are also provided; used prices are quoted from Apollo Equipment[156] or eBay from 2020. For all equipment purchased, the Town of New Paltz used MWR&R Program[157] funding from NYS DEC, which provides reimbursement for 50% of eligible costs for capital investment in facilities and equipment.[158] Mr. York noted that installation of a concrete pad would improve equipment operation and compost processing.

- Horizontal grinder for grinding yard waste, brush, and trees. Mulch produced is a carbon addition to the food waste. A magnet catches metallic objects to the size of a nail, preventing inclusion in finished compost. Used horizontal grinders range from $47,000 to $750,000. The Town's cost for its Vermeer Northeast grinder, model HG 4000, after application of the DEC reimbursement was $100,000.
- Wheel loader for moving and mixing composting material. Used wheel loaders range from $26,000 to $110,000.
- Topsoil screener for removal of contaminants and large debris from soils collected from, for example, water main break repairs. The screened soil is added to composting piles as needed to manage moisture levels. Used topsoil screeners are available as low as $12,600. A generator is used to power the screener.

4.2. Operation and Labor Needs

The operating procedures used by Mr. York and estimate of labor needs are listed below.

- Yard waste, brush, and wood collected by the Town and delivered by neighboring communities are ground twice to arrive at size suitable for application to food waste. Some woody materials are processed to a larger size for sale as mulch. A 1" screen was found to be too large.
- The smaller size woody material is mixed with the food waste using a wheel loader. A larger bucket size reduces mixing time. A leafy mold[159] is also applied to speed the decomposition process.
- Composting piles are turned every two weeks over a period of 4 months. Needed moisture is added to the compost piles by turning it on rainy days. The composting site has no access to a water truck.
- Composting pile temperatures are measured at least every 3 days to maintain a target temperature of 140˚ to 145˚.
- Mr. York estimates that 50% of his time is spent on the composting operation.
- Grinding of woody material takes one person half a day at minimum for grinding, changing out of screens, greasing, and changing teeth. The area around, beneath, and sections of the horizontal grinder are cleaned every other week.

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[156] Apollo Equipment, https://www.apolloequipment.net/equipment-for-sale?parent=122&manufacturer=&qProd=Enter+Keywords. Accessed 2020.

[157] "Grants for Waste Reduction and Prevention Projects", NYS DEC, https://www.dec.ny.gov/chemical/105608.html. Accessed March 14, 2023.

[158] According to the Program Guidelines, "If any Federal or other assistance is received for the project, reimbursement will be limited to 50% of the net eligible costs incurred after deduction of any Federal or other assistance received."

[159] The leafy mold is the same proprietary biological system employed by Greenway Environmental Services, which Greenway provided as part of technical support to the Center.

- Some equipment maintenance is done by the Town's Highway Department.
- It takes one person a day to complete all necessary mixing and turning of existing piles.

4.3. Site Visit Images

The below series of images show the Center's composting operation.

Figures 52 & 53. Left: Entrance to composting area, showing woody material processing area in foreground and closed landfill in background. Right: Woody material processing area with horizontal grinder. (Source: Carla Castillo.)

Figure 54. Typical maintenance of horizontal grinder, consisting of removal of waste accumulated beneath grinder. Michael York pictured. (Source: Carla Castillo.)

Figure 55. Ground woody material, with larger grind on left. (Source: Carla Castillo.)

Figures 56 & 57. Left: Compost processing area, with wheel loader shown. Right: New batch of compost being processed. This cone shape is used to maximize the Centers small operation footprint. The biological medium developed by Greenway creates porosity that draws air from the bottom, releasing heat from the top of the pile without any forced air system. (Source: Carla Castillo.)

Figure 58. Compost in various stages of composting process. Material behind backhoe, to right, is in curing stage. (Source: Carla Castillo.)

Figures 59 & 60. Topsoil screener. The image at left shows the fine soil remaining after screening. The image below shows the large, unusable, screen-out materials. (Source: Carla

A.6. GREENWAY ENVIRONMENTAL SERVICES

The site visit to Greenway Environmental Services,[160] located at 205 Hurds Rd, Clintondale, NY 12515 (parcel number 94.2-2-49), was conducted on August 25, 2020. At the time of the site visit, hours of operation were by appointment. The site visit was conducted to understand food waste recycling

[160] "Greenway Topsoil - Compost - Garden Soil & Organic Disposal", Greenway Environmental Services, https://www.greenwayny.com/home.html. Accessed March 14, 2023.

operation at Greenway. The site visit tour was provided by Greenway owners Josephine Papagni and Shabazz Jackson. Additional information was provided through interviews on August 17 and August 18, 2020.

1. ASSESSMENT

The composting operation at Greenway Environmental Services is located on a site sufficient in size to manage current food waste deliveries. Greenway currently has the capacity to accept food waste from a city-wide instituted compost collection program in Kingston. A cost savings of $70 per ton for tipping fees would accrue to the City, the difference between a tipping fee of $110 per ton paid at UCRRA and a $40 per ton tipping fee for food waste at Greenway. Greenway is interested in exploring a model in which the City of Kingston serves as the initial volume reduction location, with final processing completed at Greenway. Greenway is located approximately 20 miles one way from the City.

2. PROGRAM DESCRIPTION

The owners of Greenway Environmental Services describe their programming as a Zero Waste education and composting research facility. Greenway is interested in working with municipalities to pilot its Zero Waste Program. Greenway is a NYS DEC registered composting facility permitted for processing of up to 2,500 tons annually of residential food waste or 10 tons daily.

Greenway's goal is to work with municipalities to implement zero waste programs. Greenway's Zero Waste Program includes a behavior change component that uses community-based social training to foster greater compost program participation. The training is outreach-heavy, as Greenway has found modeling and demonstration as the best way to ensure a high participation rate. It also includes a green jobs creation component to foster interest in composting related jobs. Local government partnership is integral to supporting Greenway's green jobs model.

The composting operation is based on a proprietary biological system developed by Mr. Jackson[161] that breaks down complex carbohydrates and fats in food waste very efficiently and quickly. Food waste volume is reduced in size by half within six hours of the biological application. Greenways' primary source of woody material is from Central Hudson. Although most food waste is delivered by Royal Carting and City Carting & Recycling, Greenway works cooperatively with other local composting operators, such as CCC and the New Paltz ReUse and Recycling Center, to manage processing of the local food waste supply. Greenway also accepts food waste from events, working closely with events' organizers to ensure minimal contamination. Greenway prefers to not take any compostable plastics, but will accept PLA compostable serving ware if needed.

Greenway produces three products for sale: garden soil for growing vegetables and herbs, topsoil for new lawns and lawn maintenance, and compost to maintain the fertility of vegetable garden beds. Finished products are purchased by gardeners, landscapers, some construction companies, Central Hudson, some large-scale farms. Aside from being a locally produced product, an additional benefit of compost use is the reduction in toxic chemical additives.

[161] The biological system was developed by Mr. Jackson in partnership with Vassar College.

Figure 61. Greenway Environmental Services 3.34 acre food waste recycling operation outlined in electric blue. (Source: Ulster County Parcel Viewer, 2016 aerial imagery.)

3. SITE DESCRIPTION

Greenway Environmental Services food waste recycling operation is located on a 68.2 acre property owned by Hurd Orchards LLC, of which approximately 3.34 acres are used by Greenway (see Figure 61). The Ulster County Parcel Viewer lists a property classification of fruit crop. The composting operation is surrounded largely by farmland with some woodland to the west and southeast. The closest residence is 220 yards to the northeast.

Figure 62: The various areas of Greenway's composting operation on its 3.34-acre footprint. (Source: Ulster County Parcel Viewer, 2016 aerial imagery.)

4. COMPOST FACILITY OPERATION

An aerial image of Greenway's composting operation is shown in Figure 62. The finished product area is in the northern section of the site; woody materials' processing is located just above this area. The active composting areas are the dark soil mounds labeled "composting sections" on Figure 62. The ground is sloped toward the leachate detention ponds, which capture all leachate from the operation. The site is also bounded by an almost continuous, five-foot earthen berm around the perimeter of the site to serve as an additional leachate control measure during heavy rain events.[162] No odor emanated from the composting facility. The leachate detention ponds only released an odor when a breeze hit a pool. No birds or flies were present.

4.1. Equipment

Greenway uses the below-listed equipment for production of finished compost. The purpose of the equipment and associated purchase price are

[162] Mr. Jackson noted that the facility is designed to manage up to 15 inches precipitation from a single rain event.

also provided; used prices from 2020 are quoted from Apollo Equipment, eBay, Machinio[163], and Machinery Trader[164].

- Horizontal grinder for grinding yard waste, brush, and trees. A specific screen size is used to produce the mulch to which the biological medium is added. Used horizontal grinders range from $47,000 to $750,000.
- Excavator for moving materials. Used excavators range from $48,000 to $122,000.
- Wheel loader for moving and mixing composting material. Used wheel loaders range from $26,000 to $110,000.
- Trommel screener for screening of finished compost. Used topsoil screeners range from $60,000 to $250,000.

4.2. Operation and Labor Needs

The operating procedures used by Greenway and estimate of labor needs are listed below.

- The active composting area labeled composting sections in Figure 62 are organized as "parking spaces" for the delivered food waste.
- The rear of each parking space holds the wood chips pretreated with Greenway's proprietary biological medium.
- On delivery of the food waste, the excavator or wheel loader is used to mix the food waste with the pretreated woody material.
- Wood chips are added to the top as a cover to prevent bird attraction and increase porosity.
- The treated food waste is not moved nor turned until the six-month composting cycle is complete, including the 45 to 60-day curing period.
- The above steps are followed for each additional delivery of food waste.
- The finished compost is screened and mixed to produce Greenway's various soil products.
- Mr. Jackson alone manages the entire operation.

[163] "Search Results", Machinio, https://www.machinio.com/cat/trommel-screen#results. Accessed 2020.

[164] "Excavators for Sale in New York", Machinery Trader, https://www.machinerytrader.com/listings/excavators-for-sale-in-new-york/?Category=1031&State=NEW%20YORK. Accessed 2020.

4.3. Site Visit Images

The below series of images show Greenway's educational and composting operations.

Figures 63 & 64. Top: Soil products produced by Greenway Environmental Services. Bottom: A hoop house design for small scale farming suitable for urban environments and winter growing. Mr. Jackson and Ms. Papagni are pictured. (Source: Carla Castillo.)

Figures 65 & 66. Left: An in-ground backyard vermicomposting system that requires no addition of browns, developed by Mr. Jackson, pictured. The system is installed next to a bedroom window and produces no odor. Right: A rain garden designed to capture rainwater flowing off a home. Both images reflect Mr. Jackson's and Ms. Papagni's holistic, Zero Waste approach. (Source: Carla Castillo.)

Figures 67 & 68. Left: Trommel screen used for screening of finished compost. Right: Wheel loader and excavator used for moving and mixing various materials. (Source: Carla Castillo.)

Figures 69 & 70. Left: Finished compost, which had no odor and only smelled moist. Right: Leachate collection pool with wetlands plants used as a natural treatment measure. (Source: Carla Castillo.)

B. HAULERS

Interviews were conducted with five haulers providing local waste collection services to understand their capacity to offer organic waste collection services to the City of Kingston: Republic Services, Organix Solutions, Royal Carting Service Company, Waste Management, and CRP. Only one hauler, CRP, had the capacity to consider providing food waste hauling services for a Kingston organics diversion program.

B.1. RECOMMENDATION FROM HAULERS

- **The City can consider enlisting the services of local haulers for either curbside food waste collection or collection at drop-off sites.** While concerns have been raised about staff capacity to manage curbside collection, the City remains interested in managing collection of its food waste. Alternatives do exist and are available from Royal Carting Service Company for collection from drop-off sites (four 35-gallon lidded carts collected at a monthly rate of $1,126.00 plus $20.00 per tipped cart) and C.R.P. Sanitation for curbside and drop-of site collection (drop-site collection quote: $500 per month for once weekly pick up of up to 10 toters of compost).

B.2. REPUBLIC SERVICES

A telephone interview was held with Republic Services[165] Supervisor Tangina Mack on July 21, 2020.

1. ASSESSMENT

Although Republic Services has been recognized for its national organics programs, this waste management service is not available to Mid-Hudson communities. The local collection companies responsible for providing waste management services on behalf of Republic Services were unavailable to explore organics waste collection for the City.

2. BACKGROUND

Republic Services (Republic) began as Republic Waste Services in the 1990s, renaming to Republic Services in 1998. Republic merged with Allied Waste Industries, based in Arizona. Today it operates in 41 states.

In New York State, Republic provides waste management services to 263 communities. The range of services include solid waste and recycling collection, dumpster rental, waste compactor rental, electronics and battery recycling, yard waste and landscape debris collection, organic waste collection, sharps and needle disposal, and bulk waste collection. Republic collects upwards of 5 million tons of recyclable material annually and its employees give back to the local communities served by Republic through volunteering at special events.

Republic's organic waste programming includes commercial and residential food waste collection and education programming. Republic's Household Organic Waste webpage[166] lists GHG reduction, compost production, diversion of food waste from landfills, and the development of a sustainable

[165] "Republic Services", https://www.republicservices.com/. Accessed July 21, 2020.

[166] "Putting Your Waste to Use", Republic Services, https://www.republicservices.com/residents/organic-waste. Accessed July 21, 2020.

community as benefits of composting. The National Waste & Recycling Association recognized Republic with the 2020 Organics Recyclers of the Year award for their organics programs. The webpage notes organics collection is not available in all areas.

In the Mid-Hudson region, Republic provides waste management services to the Village of Harriman in Orange County, the Town of Putnam Valley in Putnam County, and the Towns of Saugerties and Woodstock in Ulster County. The Village of Harriman is located in the Towns of Monroe and Woodbury. Republic provides the below listed services to the commercial and residential customers of these communities. Organic waste collection is not offered to any Mid-Hudson community.

- Commercial Services: container collection (10- to 40-yard containers), solid waste collection, cardboard recycling, electronics recycling, common recyclables collection, batteries & lighting equipment disposal, hazardous waste collection, sharps & needle disposal, bulk waste collection, medical waste, and landscape debris collection.
- Residential Services: solid waste collection, common recyclables collection, bulk waste collection, sharps & needle disposal, and household hazardous waste collection.

3. COMMUNICATION SYNOPSIS

The conversation with Republic Services staff revealed that local collection services are outsourced to local teams. Rates for any services are provided by these local teams. No local team reached out for a further conversation on the possibility of organic waste collection services, commercial or residential.

B.3. ORGANIX RECYCLING

A telephone interview and follow-up email communications were held with Organix Recycling[167] Manager of Key Accounts & Customer Service Emilee Metcalf on July 21 and 22, 2020.

1. ASSESSMENT

The value of the Organix Layered Approach™ is its co-collection waste method, which eliminates the need for separate collection routes for organics waste collection. Implementing the Layered Approach™ to the level envisioned is expensive due to equipment needs and is not a viable option in the Mid-Hudson. Statewide legislation banning all food scraps from landfills can have a transformative impact on the waste management industry and foster the growth of actors key to diversion success: for example, Vermont saw a doubling of food scrap haulers between the 2012 passage of Vermont's Universal Recycling law and 2018. This type of legislation increases the viability of programmatic offerings like Organix Recycling. Program education for program customers as well as haulers and all waste management participants are important to programmatic success. A flexible approach to compostable bag removal at transfer stations as well as compostable bag pricing methods and distribution structures represent good business models that lead to organics diversion expansion.

[167] At the time of the interview Organix Recycling (https://www.organixrecycling.com/) was known as Organix Solutions.

Figure 71. The Organix Solutions Layered Approach. (Source: Organix Solutions.)

2. BACKGROUND

Organix' mission is to "provide cost-effective and sustainable collection and treatment solutions that recover organic waste and maximize the potential value of recyclable feed stocks." Organix uses a layered approach for managing solid waste and organics processing, which is portrayed in Figure 71.

The Organix Layered Approach™[168] is a co-collection waste program, where customers place bagged organic waste in the same tote as regular waste. Robotic sorting equipment installed at transfer stations remove the bagged organic waste. The bagged organic waste is then taken to a materials recovery facility (MRF) where BurCell System® Technology recovers the organic and non-recycled paper waste portion of the waste stream to produce a processed engineered feedstock (PEF). BurCell System® Technology consists of a cylinder in which a "vacuum aided thermal decomposition process…diverts food and other forms of methane producing organic waste from landfills."[169] The PEF can then be composted using a traditional windrows system or anaerobic digestion, depending on the locality.

In Minnesota, the Organix program is known as the Blue Bag Organics® Subscription Program[170]; currently 48 communities, largely urban with some rural, have implemented the program. Outside of the state, the program is marketed as Green Bag Organix™ Subscription Program[171]. Organic waste collection bags used are BPI certified compostable bags that decompose within 45 days at a commercial composting facility; residents collect food scraps in 13-gallon extreme duty compostable bags. Bags are available for purchase on Organix's website[172]. In Minnesota, Randy's Environmental

[168] "Our Layered Approach", Organix Solutions, https://www.organixsolutions.com/our-layered-approach. Accessed July 21, 2020.

[169] The BurCell System is described in greater detail on the Marathon Equipment website, https://www.marathonequipment.com/products/organics-processing/burcell-system, which also includes a video of the process. The Cision PR Newswire 2015 article, "Organix Solutions Commercializes BurCell Recovery Technology to Fully Remove Organics from the Municipal Solid Waste Stream", https://www.prnewswire.com/news-releases/organix-solutions-commercializes-burcell-recovery-technology-to-fully-remove-organics-from-the-municipal-solid-waste-stream-300179747.html, provides background on the design development process and the role Minnesota legislation had on the technology's development. Accessed July 21, 2020.

[170] "Blue Bag Organics Subscription Program", Organix Solutions, https://www.organixsolutions.com/blue-bag-organics/blue-bag-organics-program. Accessed July 21, 2020.

[171] "Green Bag Organix Subscription Program", Organix Solutions, https://www.organixsolutions.com/green-bag-organix/green-bag-organix-program. Accessed July 21, 2020.

[172] "Green Bag Organix Compostable Bags", Organix Solutions, https://shoporganix.com/. Accessed July 21, 2020.

Services[173], a Republic Services company, offers the Blue Bag Organics® program to its residential customers.

Organix's Co-Collection Program[174] for municipal residential collection includes resident education, marketing tools customizable for the local community or hauler, enrollment assistance, employee training, delivery of compostable bags to residents, customer services support, and annual renewal support.

Organix also produces a mulch film for use in large-scale agriculture, Organix A.G. Film[175], or Organix Agriculture General Film. The biodegradable film prevents weed growth and bypasses the use of plastics. The biopolymer product is manufactured in the US.

3. COMMUNICATION SYNOPSIS

The conversation with Organix staff covered many topics, including the impact of Vermont's organic waste law on the waste management industry; the use, cost, and distribution of compostable bags; the flexible approach to compostable bag removal; the appeal of the Co-Collection Program to haulers; Organix's education and outreach work; contamination rates; and Organix' experience working with Republic Services.

Organix Solutions is currently working with multiple haulers in Vermont, which mandated[176] organic waste collection in 2012 through Universal Recycling Act 148. The Act required food scraps collection by haulers in 2020 and banned all food scraps from landfills by 2020. Vermont saw a doubling of food scrap haulers between the 2012 passage of Vermont's Universal Recycling law and 2018.

In Vermont Co-Collection Program, organics collected from residents and commercial facilities are placed in extreme duty compostable bag. Refuse and organic waste bags are placed in the same tote. The green bags are removed from transfer stations where haulers unload waste.

Organix developed strategic partnerships for the development of different types of equipment that removes the compostable bags. Not all locations use a robotic arm to pull out the bags, as in Delano, Minnesota. For example, Organix has partnered with machinery companies that have portable sort lines. With portable sort lines, a bobcat or loader places the waste on to the sorting belt. Four to six pick stations can be included in the portable sort line. Some of the smaller haulers do manual bag removal, with two workers removing green bags from a load in approximately 10 minutes.

Organix' Co-Collection Program is appealing to small haulers, in particular, because they need not hire additional drivers nor trucks and can follow the same collection process.

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[173] "Organics Recycling", Randy's Environmental Services, https://www.randysenvironmentalservices.com/residential/organics-recycling. Accessed December 22, 2020.

[174] "Co-Collection for Municipalities", Organix Solutions, https://www.organixsolutions.com/co-collection-municipalities. Accessed July 21, 2020.

[175] Organix A.G. Film, https://agmulchfilm.com/. Accessed July 21, 2020.

[176] Current organic waste collection legislation is discussed in Appendix H. Case Studies.

Education and outreach to residents is provided by Organix. Organix supports municipalities, haulers, or whomever is managing local implementation of the Green Bag Organix™ Program. Organix has templates available for local use, including brochures, postcards, newsletters, and emails. Organix also ensures compostable bags are delivered on a timely basis and manages the subscription renewal process. Organix shared an educational pamphlet provided to participants of its Green Bag Organix™ Subscription Program; it appears at the end of this section.

To meet the needs of different composting programs, Organix has a flexible approach to compostable bags distribution to customers.

- Haulers, for example, can purchase the bags directly from Organix to provide to their customers.
- Municipalities can also purchase the bags directly from Organix for incorporation into an already existing composting program. The method for charging for bags differs by community. In some communities, the charge is added to water and sewer charges.
- For mandated programs, Organix typically handles customer notification of program implementation, including information on use and receipt of compostable bags; the notification process can be done with a postcard or email notification.
- Where haulers are not interested in managing the bag distribution process, Organix sells and ships directly to residents, such as in Vermont. A case of 100 five-gallon bags costs residents $39.95. A case of 60 15-gallon bags costs $69.96 or $99.95 for a case of 54 bags for larger bag sizes. Organix recommends keeping only one year's worth of bags on hand, although Organix bags' shelf life for an open case is two years. Organix has found use of one bag per week to be sufficient.

Organix has found that the Co-Collection Program has very low contamination rates. Organix believes that the low rates are a function of mandated programs or the out-of-pocket payment by participants for the compostable bags. Organix has found that programs with front-end resident education and engagement also result in very low contamination rates.

Organix has an in-house machinery expert who is available to support MRFs with BurCell System® infrastructure and building planning.

Organix has worked with Republic Services in Minnesota for many years and more on the Co-Collection Program. Organix has found them to be good partners with a clear understanding of the move toward organic waste diversion that is taking place throughout the country. Due to Republic's lack of availability to assist with this project (detailed in their section above), the Organix Recycling system is not a solution for Kingston at this time.

B.4. ROYAL CARTING SERVICE COMPANY

A telephone interview and email communications were held with Royal Carting Service Company[177] Strategic Relations Consultant Jonathan Kaplan and Sales Manager Vincent Nunziato between August 17 and September 11, 2020.

[177] "Royal Carting", Royal Carting Service Company, https://royalcarting.com/. Accessed August 17, 2020.

1. ASSESSMENT

Royal Carting Service Company (Royal Carting) currently only provides food waste collection services to industrial and commercial customers. While Royal Carting is available to respond to a request for proposal issued by the City of Kingston for City-wide food scraps collection, it currently has no experience with residential food waste collection. Interviewees stated that as a company focused on commercial and residential waste collection since 1955, Royal Carting has significant experience with efficient collection routing design.

2. BACKGROUND

Royal Carting Service Company began in 1955, serving a single Dutchess County route with one truck. Royal Carting expanded from residential collection to drop-off services and commercial waste collection. With its sister company, Welsh Sanitation Service (Welsh Sanitation), Royal Carting has a fleet of 140 trucks, more than half of which are zero emissions vehicles.[178] In Ulster County, Royal Carting provides waste collection services in the southeastern quadrant while Welsh Sanitation provides collection services in the northeastern quadrant.[179] The City of Kingston is located in the County's northeastern quadrant. Royal Carting supports local hospitals, colleges, and local nonprofit organizations.

Royal Carting operates its own single stream recycling drop-off center in Hopewell Junction and two NYS DEC permitted transfer stations in Wingdale and Amenia. Both companies offer residential and commercial garbage and recycling collection, roll-off dumpster rentals for residential use, and drop-off service. Electronic waste collection is offered as a drop-off service at both transfer stations. Commercial waste services provided by both companies include waste collection for businesses, construction, and local governments; confidential file destruction; and food waste collection[180] for industrial and commercial customers. Welsh Sanitation also provides manure removal services through Welsh Organics.[181] Manure from horses, sheep, llama, goats, and most animal bedding is accepted and composted.

3. COMMUNICATION SYNOPSIS

The communications with Royal Carting focused, in order of conversation, on Royal Carting's food waste collection practices, the Ulster County Zero Waste Initiative, routing considerations for composting programs, and obtaining cost estimates for food scraps collection services. A synopsis of the input shared is listed below by topic area.

- Food Waste Collection Practices: Royal Carting's organic waste collection services are currently only available to large generators. Royal Carting is one of few haulers with a dedicated vehicle for food waste collection.

[178] "About Us", Royal Carting Service Company, https://www.royalcarting.us/royal-about-us. Accessed August 17, 2020.

[179] A map of Royal Carting's and Welsh Sanitation's service territories is found at https://www.royalcarting.us/. Accessed August 17, 2020.

[180] Greenway Environmental Services noted in an August 17, 2020, conversation that they had worked with Royal Carting for decades. See "Food Waste Processing", "Composting Facility Site Visits" in this Study for additional information on Greenway Environmental Services.

[181] "Welsh Organics", Welsh Sanitation Services, https://www.royalcarting.us/welsh-organics. Accessed August 17, 2020.

- Ulster County Zero Waste Initiative: Royal Carting sits on the Ulster County Recycling Oversight Committee and has participated in conversations regarding implementation of Ulster County's composting law.[182] Zero waste efforts also have been discussed.
- Routing: To reduce labor costs associated with food scraps collection, a well-designed routing plan is key. Efficient and sustainable routing plans are best prepared by companies focused on waste collection.
- Cost Estimate for Food Scraps Collection Services: Royal Carting can provide a cost estimate for food scraps collection services on the City's issuance of a request for proposal. Royal Carting can provide estimates with and without provision of compost collection receptables. An initial inquiry to Royal Carting provided information on demographics of the collection (residential, small business, etc.), insurance requirements, participation assumptions by collection day run, and possible drop-off locations.

4. DROP OFF PRICING

The City of Beacon is planning a drop-off composting program similar to those implemented in Westchester County. They received a quote from Royal Carting for this service in November 2020 and shared it with the Kingston team. The details are as follows, "Royal's service will include providing four (4) 35-gallon lidded carts. Each cart will be lined with a compostable liner installed by Royal Carting Service. Royal Carting will pick up the carts twice per week, (Monday and Thursday) between 12:00 pm and 2:00 pm, remove the compost material and liner, and install a new liner. We propose a monthly rate of $1,126.00 for this service plus $20.00 per tipped cart. The driver will provide a voucher to confirm the number of carts serviced. The carts will not be weighed."

B.5. WASTE MANAGEMENT

Attempts were made to reach Waste Management[183] staff by phone and Waste Management's website chat function to discuss their ability to provide hauling services for a potential City composting program between August 17 and September 11, 2020. Contact was not made.

1. ASSESSMENT

An inability to reach Waste Management (WM) staff to discuss provision of hauling services for a potential City composting program resulted in no additional information beyond what was available on WM's website.

2. BACKGROUND

Waste Management collects waste and manages landfills. WM's environmental stewardship efforts include converting closed landfills to natural habitats, using methane from WM landfills to power their fleet, and the CORe® organic recycling program[184]. CORe® converts food waste collected from restaurants, schools, food processing plants, and grocery stores into a slurry that is added to waste

[182] Section 304-31 Recycling Oversight Committee of the Ulster County Code describes the purpose of the Committee "Section 304-31 Recycling Oversight Committee", Ulster County Code, https://www.ecode360.com/14969953. Accessed December 28, 2020.

[183] "Municipalities", Waste Management, https://www.wm.com/us/en/home/municipalities. Accessed December 28, 2020.

[184] "Organics – CORe®: Turning Food into Energy", Waste Management, https://sustainability.wm.com/2018/waste/organics/core. Accessed December 28, 2020.

water treatment plant anaerobic digesters. The addition of the slurry increases digester biogas and energy production.

WM provides residential services,[185] including waste and recycling collection, dumpster rentals, large items collection, electronic waste collection, and hazardous waste collection. WM also provides waste management solutions for municipalities, homeowner associations, and property management companies. Municipal programs for residential areas include organics collection, with support from WM's sustainability consultants, development of waste management sustainability plans, recycling by mail for items like aerosol cans and batteries, and solar-powered compactors.

WM's commercial services[186] include waste and recycling collection, dumpster rental, solar-powered trash compactors, electronics recycling, and portable toilets. WM also provides waste management solutions by industry sectors, like office and retail, restaurants, entertainment venues, healthcare facilities, pharmaceutical businesses, and grocery stores.

3. COMMUNICATION SYNOPSIS

Attempts by phone and the WM website chat function to learn about WM's ability to provide hauling services for a potential City composting program were unsuccessful. No message could be left on the WM phone system and the chat function indicated that WM did not provide any services in the Kingston area.

B.6. C.R.P. SANITATION

A telephone interview and email communications were held with C.R.P. Sanitation[187] Sales Manager Michael Fiumara on December 22, 2021.

1. ASSESSMENT

C.R.P. Sanitation has provided organics hauling services throughout Westchester County[188] and is willing to consider hauling organics, either curbside or from a drop off location, from the City of Kingston. They are an experienced organics hauler and worth considering if Kingston decides to pursue an outside hauler.

2. BACKGROUND

C.R.P. Sanitation has been servicing customers in the Westchester area for over 35 years. They are currently a Full-Service company operating a fleet of over 60 trucks. They service over 2,500 commercial accounts, as well as over 3,000 contractors, and over 10,000 residences in Westchester County.

Their organics services amount to a full route of one truck one day per week on Friday. They are about to expand to two days a week. Their customers include schools, churches, restaurants, residential

[185] "For Home", Waste Management, https://www.wm.com/us/en/home. Accessed December 28, 2020.

[186] "For Business", Waste Management, https://www.wm.com/us/en/business. Accessed December 28, 2020.

[187] "C.R.P. Sanitation", CRP, https://crpsanitation.com/. Accessed December 22, 2021.

[188] According to Westchester County Energy Conservation and Sustainability Director Peter McCartt, Suburban Carting also provides hauling services for Westchester and Putnam Counties. No information on Suburban's organics collection services were available on their website (https://www.suburbancarting.com/).

homes, and drop off locations. They used to service more municipal accounts until Westchester County consolidated the municipal drop off programs under one contract.

C.R.P. owns and manages Sustainable Materials Management, Westchester's first NYS DEC Registered food scrap composting facility. Currently the Westchester County food scrap drop off programs contracted through Westchester County are hauled to Sustainable Materials Management.

3. COMMUNICATION SYNOPSIS

The conversation with C.R.P. Sanitation covered whether they would be able to haul organics, either doing curbside pickup or from a drop-off program, from the City of Kingston. They are willing to consider both potential programs and would be a candidate to receive a request for proposals if the City decides to contract out their organics hauling services.

The conversation also covered whether C.R.P. would bring organics collected in Kingston to Sustainable Materials Management, their composting facility in Cortlandt, NY, approximately 60 miles southeast of the City of Kingston. C.R.P. Sanitation noted that this would depend on the regulations in Ulster County, specifically related to their flow control law that requires waste flow through UCRRA. C.R.P. would need to know more information about how this law works and if organics apply. If not, they may bring the organics collected to Sustainable Materials Management rather than a closer facility.

4. DROP OFF PRICING

The City of Beacon is planning a drop-off composting program similar to those implemented in Westchester County. They received a quote from C.R.P. Sanitation for this service in December 2021 and shared it with the Kingston team. The details are as follows: C.R.P. Sanitation would charge $500 per month for once weekly pick up of up to 10 toters of compost. They will not weigh the toters and the toters are not included in the pricing.

C. COMPOSTING TECHNOLOGIES

C.1. OVERVIEW

This section describes in broad terms the available composting technologies appropriate for various food waste volumes and their respective spatial and operational requirements, as well as relative cost comparisons. Research was conducted for composting technologies for residents, small businesses, and composting at the municipal scale. The development of this section relied on the technical recommendations and relative cost information provided in the New York State Pollution Prevention Institute's *Rhinebeck Feasibility Study*[189], the *Dutchess County Organics Recycling Study*[190], the *Westchester County Food Waste Study*[191], *Michigan Compost Operators Guidebook*[192], *District of*

[189] "Food Scraps | Department of Environmental Conservation", Vermont DEC, https://dec.vermont.gov/waste-management/solid/materials-mgmt/organic-materials Accessed November 30, 2021.

[190] Griffith, Sharon, Jeff Luoma, Erica Blatt, and Camille Marcotte, "Dutchess County Organics Recycling Study, Task 5.1," 2017.

[191] Kopicki, Vincent, Louis J. Vetrone, and Melissa-Jean Rotini. "Memorandum: Westchester County Food Waste Study: Report and Initiatives", January 27, 2020. https://environment.westchestergov.com/residents/food-waste.

[192] Chardoul, Nicole, Kerrin O'Brien, Beth Clawson, and Matthew Flechter, eds. "Compost Operator Guidebook: Best Management Practices for Commercial Scale Composting Operations", Michigan Department of Environmental Quality, March 2015, https://www.michigan.gov/documents/deq/deq-oea-compostoperatorguidebook_488399_7.pdf

Columbia Compost Feasibility Study,[193] and the recommendations laid out for small businesses in *Compost At Work: On-Site Composting for Businesses in Alameda County.*[194] Also referred to in the evaluation of composting technologies were materials from the U.S. Environmental Protection Agency,[195] the New York Department of Environmental Conservation,[196] and the Vermont Department of Environmental Conservation.[197]

As a preface to the technologies discussed below, the basic mechanisms of composting are provided. Composting is the slow breakdown of organic materials by aerobic microbes that require aeration, moisture, and self-sustained heat to process organic waste materials into a rich and functional fertilizer or soil amendment. As such, composting is a process that involves monitoring temperature, volume, dry-to-wet and brown-to-green ratios, and aeration. The larger the volume of food waste, the greater care is needed in managing the process.

- **Temperature:** When compost piles sustain temperatures between 135° -160° Fahrenheit through the heat released from decomposition, the process is significantly faster[198]. Temperatures ranging around 150° Fahrenheit are sufficient to discourage pests, though temperatures should not reach above 160° Fahrenheit for extended periods to avoid death of the thermophilic microbes that conduct the decomposition[199]. A drop in temperature before material is fully composted typically means that the pile is in need of aeration.
- **Moisture:** Variations in moisture content between 40-65% are acceptable. Should moisture content be less, microbial activity is limited; and should moisture content exceed 65%, conditions may become anaerobic[200]. The balance of moisture, like the balance of carbon and nitrogen, can typically be maintained through the addition of brown material (leaves, yard waste, wood chips, shredded newspaper, etc.) or the addition of green material (food waste).
- **Carbon-to-nitrogen ratios:** The ideal compost is created with a roughly 25-35:1 carbon to nitrogen ratio (C:N), which is separate from, but the basis of, the more commonly referred to brown-to-green ratio. The overall C:N ratio can be obtained through the sum of the C:N ratio of different feedstocks in the proportions that they are to be combined in – for instance, yard waste (45-50:1 C:N) could be combined with poultry manure (10 C:N) to create an appropriate balance of carbon to nitrogen. The brown-to-green ratio is a more casual manner of referring to the C:N ratio, typically used in non-commercial settings. For residential composting, typically

[193] RRS, "District of Columbia Compost Feasibility Study," District of Columbia Department of Public Works, April 2017. https://dpw.dc.gov/compostfeasibilitystudy.

[194] "Compost At Work: On-Site Composting for Businesses in Alameda County", StopWaste.Org, July 2011. https://www.stopwaste.org/resource/compost-work.

[195] "Types of Composting and Understanding the Process", US EPA, OLEM, https://www.epa.gov/sustainable-management-food/types-composting-and-understanding-process Accessed December 3, 2021.

[196] "Organic Materials Management", NYS DEC, https://www.dec.ny.gov/chemical/8798.html, Accessed December 3, 2021.

[197] "Food Scraps", Vermont DEC, https://dec.vermont.gov/waste-management/solid/materials-mgmt/organic-materials. Accessed November 30, 2021.

[198] "Compost Fundamentals: Compost Needs - Temperature", Washington State University Extension, http://whatcom.wsu.edu/ag/compost/fundamentals/needs_temperature.htm Accessed December 20, 2021.

[199] "Compost Fundamentals: Compost Needs - Temperature", Washington State University Extension.

[200] "Monitoring Compost Moisture", Cornell Composting, http://compost.css.cornell.edu/monitor/monitormoisture.html Accessed December 20, 2021.

a 2:1 or 3:1 ratio of browns to greens is appropriate to maintain a 25-35:1 C:N balance, though sources differ. For commercial composting, composters will want to manage their brown-to-green or dry-to-wet ratios more closely via summation of the individual feedstocks' C:N ratios to achieve sufficient temperature, moisture, and carbon-to-nitrogen content in finished compost.

- **Aeration:** Compost needs to be aerated regularly to provide oxygen for the aerobic microbes that create the decomposition. In a residential or small-scale context, this can be done weekly or every few days with a shovel. In a commercial context, however, there are several different options for aeration, including the installation of passive aeration pipes around which windrows are built, blowers that pull forced air through those pipes, bucket loader machines that operators use to manually turn the windrows, or more advanced turning machinery. For commercial windrow composting, the allocation of space for turning machinery is a necessary consideration; while aerated static piles are instead aerated through pipes.

C.2. RECOMMENDATIONS ON COMPOSTING TECHNOLOGIES

- **Develop a residential composting technologies guide for residents as part of a curbside food waste collection program.** Research revealed the many options for residential composting, including indoors and outdoor options, electric and manual. Depending on the City's collection schedule for food waste, many residents may prefer to remove their food waste more readily.
- **Develop a small commercial composting technologies guide for small commercial businesses as part of a curbside food waste collection program.** While the options for small scale composters were fewer, some viable options can be provided on program roll-out for consideration by small commercial businesses, and food businesses, such as restaurants, in particular. The cost for some of the technologies may be cost prohibitive for individual businesses, but a technology shared by a few businesses may be more attractive.
- **The City should continue to consider composting technologies at the municipal scale.** Despite the inability to identify a location for a municipal-scale composting facility, the City should continue to consider these technologies, in particular, EASPs due to the lower implementation costs. Bringing the management of a municipal scale composting facility home would allow for greater flexibility over contamination concerns and acceptable compostable products.

C.3. RESIDENTIAL COMPOSTING TECHNOLOGIES

Residents who choose to forego municipal food scrap collection can instead pursue backyard composting through any of the methods described below – even with limited space. The end product is particularly beneficial for those residents who are interested in gardening, amending their soil to support healthy microbial systems, sustaining native plants, insects and birds, and/or foregoing chemical fertilizers for their lawns. It is important to note that none of the methods below can compost meat or dairy as those materials require higher temperatures to decompose. It is also important to note that all of the below methods benefit from aeration, or turning, which speeds up decomposition and reduces odor by creating an aerobic environment with appropriate moisture and temperature levels.

When collecting food scraps in a home kitchen, it is easiest to store them for a few days rather than heading out to the backyard every time food waste is generated – a small steel or ceramic kitchen bin with a carbon filter can stop food scraps from smelling, as long as care is taken to rinse out any liquid in

the bin. A review of available bins for kitchen collection is found in this Study's Appendices, Appendix F. Bins, Liners, & Totes.

1. HEAP COMPOSTING

Heap composting is the least costly form of residential composting as it requires only yard space, a shovel, and brown and green composting materials. However, heap composting is also untidy, meaning that for properties with space constraints or close proximity to other residences, it may not be ideal. Typically, homeowners select a minimum 3x3 foot (1 cubic yard) space on flat, well-drained land[201], set down a layer of brown material and cover it with a layer of food scraps. The bottom layer of brown material – often yard waste - aerates the heap, allowing decomposition. As with any composting method, the ratio of browns to greens should be either 2:1, as recommended by the Maryland Department of the Environment[202], or the commonly used 3:1. Weekly turning speeds up the process substantially, so that finished compost is produced in three to six months rather than a year.[203] Volume should eventually become substantial enough that temperature within the heap reaches 150 – 160F[204] through microbial decomposition – if the pile is too small, then those temperatures may not be reached.

"Hot" composting following the Berkeley methodology[205] speeds up the process substantially (ideally producing compost in 18-21 days), but requires a substantial amount of finely shredded material (a 3 x 3 x 5 foot pile) at the initiation of the composting process as well as a more regular schedule for turning. Dependent on the space constraints and amount of food and yard waste produced on a regular basis, residents can pursue either method, though cold composting is less labor-intensive and allows residents to slowly build a composting pile over time.

[201] "Building Your Own Composting Pile", Maryland Department of the Environment, https://mde.maryland.gov/programs/land/recyclingandoperationsprogram/pages/compostbin.aspx. Accessed December 21, 2021.

[202] "Building Your Own Composting Pile", Maryland Department of the Environment.

[203] "Types of Composting and Understanding the Process", US EPA, OLEM, https://www.epa.gov/sustainable-management-food/types-composting-and-understanding-process. Accessed December 3, 2021.

[204] Miller, Sam. "The Dirt on Making Dirt", FoodCycler. https://www.foodcycler.com/post/dirty-dozen-12-top-composting-methods-pros-cons-costs, 2019.

[205] "How to Make Compost in 18 Days Using the Berkeley Hot Composting Method", Deep Green Permaculture, https://deepgreenpermaculture.com/diy-instructions/hot-compost-composting-in-18-days/, 2010.

2. COMPOST BINS

Compost bins are similar to heap composting, except that the compost pile is insulated somewhat from the elements and from pests, creating a neater look and serving to deter pests. Compost bins can be purchased starting around $38 (the Geobin) or constructed out of untreated wood[206] (or untreated wood and chicken wire). Treated wood, including pressure-treated wood, may release chemicals (chromium, copper, and arsenic) into compost that may decrease healthy microbial activity and make food unsafe or inedible. There are a multitude of plans available online for the low-cost construction of these bins, including plans for construction of a hot-bin composting system published by the Vermont Department of Environmental Conservation,[207] the Interstate Commission on the Potomac River Basin,[208] and others.

Compost bins, like piles, benefit from turning to maintain high temperature and will compost faster if turned. Most are designed to have the front panel slide up or open to facilitate turning, which can otherwise be awkward. For large or multi-family households, for instance, in an apartment complex or multi-family building, the three-bin system below in the small business section may be more suitable. Table 29. Compost Bins describes a few of the most commonly available bins for residential households.

Table 29. Compost Bins (2021 Pricing)

Bins Images	Bin Type	Cost	Size D x L x H[209]	Capacity	Composting Time
	Geobin	$35 per unit	Up to 48 inches diameter x 36 inches in height	38 cubic feet	Six months – 1 year
	EcoGardener	$70 per unit	24 x 16 x 33 inches	80 gallons	Six to eight weeks
	Garden Gourmet	$70 per unit; two units typical	23 x 23 x 40 inches	82 gallons	Six months – 1 year
	Earth Machine	$100 per units; two units typical	Up to 33 inches diameter x 33 inches in height	80 gallons	Six months – 1 year

[206] "Does Pressure-Treated Wood Belong in Your Garden?", FineGardening, https://www.finegardening.com/article/does-pressure-treated-wood-belong-in-your-garden. Accessed December 8, 2021.

[207] "On-Site Composting – Designing A Bin System for Hot Composting", Vermont DEC, https://dec.vermont.gov/waste-management/solid/materials-mgmt/organic-materials. Accessed December 3, 2021.

[208] Interstate Commission on the Potomac River Basin et al., "Build a Compost Bin", ICPRB, https://www.potomacriver.org/resources/get-involved/water/build-a-compost-bin/. Accessed December 8, 2021.

[209] Diameter x Length x Height.

	Hot Box Composter	Materials	36 x 36 x 36 inches	27 cubic feet	Six months
	Soil Saver Compost Bin	$140	28 x 28 x 30 inches	94 gallons	Six to eight weeks

3. COMPOST TUMBLERS

Compost tumblers are particularly useful for renters, residences with a limited backyard space, or people with limited mobility, as they do not require turning with a shovel. Given that a compost tumbler is a contained space with sustained temperatures, they also process faster than bin composting or heap composting – often advertised as two to three weeks, but more commonly seen as five or six weeks[210]. Despite their compact design, tumblers can be labor intensive as turning is recommended anywhere from three times per week to twice daily[211]. If unturned, tumblers will compost more slowly or may become anaerobic.

Tumblers require more careful attention to moisture, and usually a higher brown-to-green ratio than for other composting methods, because there is less room for evaporation within the contained tumbler and wet material will become anaerobic. They should have a few aeration holes, and should not be positioned in direct sunlight, as direct sunlight will fade and distort the plastic. Though the compost is usable after a recommended period, it has not been digested by worms, and therefore some gardeners will set it aside to 'worm-cure' in a heap before usage. Dual chamber tumblers allow gardeners to extract finished compost from one side when the other side is reserved for active composting. While there are units with a capacity over 9.5 cubic feet, these units do become difficult to turn. According to compost tumbler vendor EarthEasy, the 7.5 cubic foot size is appropriate for a family of four[212]. Tumbler options are presented in Table 30. Compost Tumblers.

Table 30. Compost Tumblers (2021 Pricing)

Tumblers Images	Bin Type	Cost	Size L x W x H[213]	Capacity	Time
	IM4000 Dual Chamber Tumbling Composter	$75 via Amazon	28 x 30 x 36 inches	37 Gallons	Finished compost in thirty days with accelerator.

[210] "Compost Tumblers - Everything to Know Before Buying One", Rural Living Gardening | Hydroponics | Generators. 2020. https://rurallivingtoday.com/gardens/compost-tumbler/.

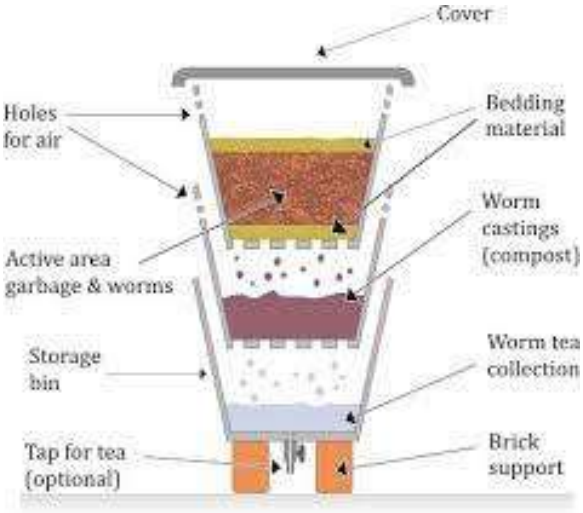
[211] "Turning Compost: Ways To Turn The Compost Pile", Gardening Know How, https://www.gardeningknowhow.com/composting/basics/turning-compost-pile.htm. Accessed December 21, 2021.

[212] "Compost Tumblers", Eartheasy Guides & Articles, https://learn.eartheasy.com/guides/compost-tumblers/. Accessed December 21, 2021.

[213] Length x Width x Height.

	EZ Compost Wizard	$155 via Wayfair	30 x 22 x 23 inches	45 Gallon/ 7 Cubic foot, various sizes	Finished compost in two weeks.
	HotFrog Dual Body Tumbling Composter	$120 via Amazon	30 x 28 x 36 inches	37 Gallon	Finished compost in two weeks.
	Mantis BackPorch ComposTumbler	$220 via Amazon	37 x 31 x 26 inches	5 cubic feet/37 gallons	Finished compost in 4-6 weeks.
	Mantis Compact ComposTumbler	$310 + $50 shipping at time of publication	33 x 42 x 43 inches	88 gallons	Finished compost in 4-6 weeks

4. VERMICOMPOSTING



Rather than traditional compost, vermicomposting, or worm composting, produces a rich, dark soil amendment full of plant growth hormones, humus, and humic acid. One pound will cover about ten square feet[214], because it need only be applied in a thin layer given the richness of the additive. Vermicomposting also produces compost tea, which is a nutrient rich liquid fertilizer that can be applied near the base of plants before watering, which is created through soaking worm castings in water.[215] Worm composting bins are comparable in price to other previously discussed residential composting technologies and are easy to maintain, with many designed for indoor usage that includes a lid that prevents worms from escaping. Optimum temperatures are 55-80 degrees Fahrenheit,[216] and the most frequently recommended worms to use are *Eisenia foetida, or red wriggler worms.* One pound of worms can consume ¼ pound of food waste per day[217] - or a weekly capacity of a quart of food scraps per square

[214] Vermicomposting", NC State Extension, https://composting.ces.ncsu.edu/vermicomposting-2/. Accessed January 6, 2022.

[215] "Worm Composting: A Beginner's Guide", Planet Natural, December 7, 2012. //www.planetnatural.com/worm-composting/.

[216] "Worm Composting – Vermicomposting", Gardener's Supply, https://www.gardeners.com/how-to/worm-composting/5714.html. Accessed December 22, 2021.

[217] "Vermicomposting for Households", NC State Extension, https://composting.ces.ncsu.edu/vermicomposting-2/vermicomposting-for-households/. Accessed January 6, 2022.

foot of bin surface area[218]. No turning is necessary, and the only necessary brown waste is a small handful of shredded paper which gets added each time food scraps are deposited. Only an inch or two of food waste can be deposited at a time, meaning that this is perhaps most appropriate for residential usage, or demonstration usage in schools. However, with careful maintenance (worms must be fed once a day or once every two days), vermicomposting can be expanded – farms have vermicomposted manure, and municipalities can vermicompost food residuals, yard waste, or sewage sludge[219]. Instructions on vermicomposting and constructing homemade bins are available on the EPA website[220], and there are a number of valuable resources available through the North Carolina State Cooperative Extension.[221] It can take between three and six months for a vermicomposter to produce usable compost.[222] Vermicomposting options are presented in Table 31. Vermicomposters.

Table 31. Vermicomposters (2021 Pricing)

Vermicomposters Images	Bin Type	Cost	Size L x W x H[223]	Capacity	Time
	4 Tray Worm Compost Kit by Quest	$60	9 x 12 x 8.5 inches	4 trays; 3 sq ft	Between three and six months; can handle a pound of food scraps weekly per square foot once established.
	Vermihut	$100	17 x 17 x 33 inches	5 trays; 10 sq ft	Up to six months; can handle a pound of food scraps weekly per square foot.
	The Worm Factory 360	$150	18 x 18 x 28 inches	4 trays; 9 square feet	Up to six months; can handle a pound of food scraps weekly per square foot.
	The Hungry Bin	$368	24 x 26 x 37 inches	Continual feed system with tray for worm castings or compost tea	Processes up to 4.4 pounds of waste per day.

[218] "How to Create and Maintain an Indoor Worm Composting Bin", US EPA, OLEM. 2016. https://www.epa.gov/recycle/how-create-and-maintain-indoor-worm-composting-bin.

[219] "Vermicomposting", NC State Extension.

[220] "How to Create and Maintain an Indoor Worm Composting Bin", US EPA.

[221] "Vermicomposting", NC State Extension.

[222] "Composting with Worms", OSU Extension, https://catalog.extension.oregonstate.edu/em9034. Accessed December 22, 2021.

[223] Length x Width x Height.

5. INDOOR ELECTRIC COMPOSTERS

Indoor electric composters are a new development in the composting market. Designed to simplify the composting process, electric composters typically use some variation of dehydration, grinding, and heating to process the food scraps into a soil additive. The process, which varies from brand to brand, takes anywhere between 3-48 hours and results in something that is not compost, but that can be combined with outdoor soil in a 1:10 ratio to fertilize plant growth. Most of the additives are sterile, but will recuperate microbial life in 4-8 weeks – some brands include bacterial additives to accelerate that process. These processes typically reduce waste volume by 85-90%, and despite their electricity usage, may reduce emissions even further than backyard composting (which releases small quantities of methane emissions).

Small indoor composters are sized for either countertop or floor usage, typically include carbon filters to reduce any potential odor, and range from $400 to $800. They are best suited for at-home applications where homeowners have little time for outdoor composting, but have some outdoor space where they can mix the additive into the soil, or a community garden they could donate the additive to. The FoodCycler, a product created by Vitamix, is the most well-known, but not the only market-available indoor electric composter. In 3-8 hours, on a daily basis, the cubic-foot FoodCycler takes food scraps (including meat, dairy, and small bones), and produces a sterilized soil additive. Commercial-scale models are also available, though they may produce such a large amount of soil additive that it becomes difficult to offload, considering the 1:10 ratio necessary for mixing, and the necessary 'curing' period of at least six weeks. If the 1:10 ratio is exceeded, plants may undergo nitrogen overload from these additives. Indoor options are presented in Table 32. Indoor Electric Composters.

Table 32. Indoor Electric Composters (2021 Pricing)

Indoor Electric Composters Images	Name	Volume	Cost	Time	Notes
	Food Cycler	1 cubic foot	$400	3-8 hours	Can process meat, dairy and small bones. Additive is sterile.
	Lomi by Pela	1 cubic foot	$500	4-12 hours	Uses LomiPod bacterial additives to create a more soil-like additive. Can process bioplastics
	Kalea	9 W x 25.5 H x 20 D inches	$800, not yet on market	48 hours	Can process meat and dairy; has a slightly larger internal capacity for food waste

C.4. SMALL COMMERCIAL COMPOSTING TECHNOLOGIES

The options below are likely to be successful for smaller food generators only, or in the case of in-vessel composting, medium-sized food generators. However, the high initial costs of in-vessel composting may or may not discourage medium-sized food generators from this version of on-site composting (see Table 34. Small In-Vessel Composting).

Compost piles that don't reach high enough temperatures will not break down food waste, while piles that are not turned frequently enough may generate internal temperatures that are too high to effectively process waste. It is important to be aware that none of the on-site options below, besides in-vessel composting, are able to handle the addition of meat or dairy, because internal temperatures generated are not sufficient to break them down, and improperly composted meat and dairy is more likely to attract pests.

In order to compost successfully, businesses will need to source the correct amount of brown waste to combine with the generated food waste (green waste), usually in a 2:1 or 3:1 brown:green ratio, depending on the nitrogen to carbon ratios of the materials used as brown waste. Another critical component to this process is the necessity of finding a use for the finished or unfinished compost created. For small businesses that don't have a gardening or landscaping use for the finished compost, there may be a nearby community garden or residential gardening program with which a partnership could be formed.

1. THREE-BIN COMPOSTING

If the volume of food waste produced is at or less than fifteen pounds per week, small, non-food producing businesses may want to pursue a 3' X 3' backyard bin or three-bin system (minimum of 3' x 9' of space required). Typically, in a three-bin system, the first bin is used for the initial raw, mixed compost materials, while the second contains more decomposed material, and the third bin more mature compost. Materials are rotated through the bins through turning with a shovel. Using the more conservative EPA Factor[224] that 22 pounds of food waste fit in a cubic foot, and that 9 pounds of dry wood chips fit in a cubic foot (assuming wood chips as the carbon feed) and assuming a 3:1 brown to green ratio, a typical 3' X 3' three-bin system with a volume of 81 cubic feet can hold roughly 450 pounds of food waste, which may take between 3-24 months to compost [225], depending on temperature and frequency of aeration. Given the gradual reduction of volume through decomposition, with the end resulting compost taking up one-third or one-fourth the cubic capacity of the original feed material[226], it is likely that more food waste could be added to the bin/contained in the bin than this original estimate.

[224] "Volume-to-Weight Conversion Factors for Solid Waste", US EPA, OLEM Reports and Assessments, April 12, 2016. https://www.epa.gov/smm/volume-weight-conversion-factors-solid-waste.

[225] "Types of Composting and Understanding the Process", US EPA, OLEM Overviews and Factsheets, August 19, 2015. https://www.epa.gov/sustainable-management-food/types-composting-and-understanding-process.

[226] Chardoul, Nicole, et al, "Compost Operator Guidebook: Best Management Practices for Commercial Scale Composting Operations."

Another estimate puts the capacity of a three-bin system at "90-300 gallons of compost each at different stages of decomposition"[227]. This would mean the bin could hold, at the high end, between 300-430 pounds of food waste before decomposition. Assuming that it takes 9 months to decompose and produce finished compost, the weekly capacity of a three-bin system is at max 12 pounds per week. Given, again, the reduction of volume throughout the process of decomposition, the total weekly capacity is likely a few pounds higher, and variable dependent on frequency of turning and frequency of addition of material.

For businesses producing a small volume of food waste, increasing the temperature within a three-bin system can speed up the processing time for composting substantially, producing finished compost in three to five months. A hot-bin system is created by insulating the walls and lid of the bins with hardware cloth, and leaving aeration slots in the floor of the bin. The Vermont Natural Resources Agency has provided instructions for hot bin composting design, though that is a raised platform four-bin system[228]. The cost for a commercial three-bin system starts at roughly $220 for a wire construction bin set, and $145 for a single 3x3ft cedar bin, while constructing a compost bin out of untreated lumber may reduce costs. Three-bin options are listed in Table 33. Three-Bin Composters.

Table 33. Three-Bin Composters (2021 Pricing)

Three-Bin Images	Bin Type	Cost	Size L x W x D	Capacity	Time
	Greene's Fence RCCOMP36 Compost Bin	$145	36 x 36 x 31 inches	23.56 cubic feet; enough to compost 130 pounds of food waste	3-24 months
	3-Bin Wire Composter	$230	84 x 28 W x 35 inches	48 cubic feet; enough to compost roughly 260 pounds of food waste	3-24 months

2. SMALL IN-VESSEL COMPOSTING

Small in-vessel composters suitable for food waste producing businesses can be manually turned or require electricity for the composting process. For businesses that produce an amount of food waste above that which is appropriate for a three-bin system (fifteen pounds per week, estimated), or businesses whose location is not conducive to an open-air three-bin system, an in-vessel closed system is able to handle a more significant amount of food waste and processes more quickly, though open-air curing time is necessary after offloading the unfinished compost and this technique requires additional amounts of space. The size of these in-vessel systems ranges, meaning that it is

[227] Griffith, Sharon, Jeff Luoma, Erica Blatt, and Camille Marcotte, "Dutchess County Organics Recycling Study".

[228] "Food Scraps", Vermont Department of Environmental Conservation", https://dec.vermont.gov/waste-management/solid/materials-mgmt/organic-materials. Accessed November 30, 2021.

possible to acquire one appropriate for any size of a small or medium food-producing business, starting at roughly $3,000 for a manually turned model (turned daily when fed compost), or $12,000 for an electric model, which uses a rotary augur to blend material. Small electrified systems typically require a 220-240 volt electrical connection, and costs range from $12,000 to upwards of $65,000 depending on size and brand[229]. On the small end, in-vessel composters can handle up to 80 gallons of food waste weekly. On the large end, in-vessel composters can handle up to 5-7 tons of food waste per day, but require 3-phase connection and higher electrical usage. Typically, the open-air curing process requires that the compost unloaded from the in-vessel composter be loaded into windrows and aerated (turned) for, at minimum, 21-40 days,[230] after which it requires an additional curing time of at least 21 days. Small in-vessel options are shown in Table 34. Small In-Vessel Composters.

Table 34. Small In-Vessel Composters (2021 Pricing)

Small In-Vessel Images	Bin Type	Cost	Size	Capacity	Time
	Rocket Composter A500	Starts at $22,000 [231]	Smallest (8.2 L x 2.3 W x 4.3 H feet)	Smallest starts at 80 gallons food waste at 1:1 ratio weekly	14 days to compost; 21-40 days aerated; 21+ days curing
	Rocket Composter B2500	$520,000	Largest (33 L x 13 W x By design H feet)	Up to 5 tons of mixed woody material and food waste daily	8 days to compost; at least 2 weeks aerated/matured; at least two weeks curing
	Earth Cube	$4,500	48 L x 40 W x 45 H feet	275 gallon capacity; Up to 50 lbs. of total feedstocks/day	21 days minimum in-vessel; curing time 1-6 months
	Ridan	$3,050 - $5,000 + $485 per maturing tank	8 ftL x 3.2W x 5.24 ft H	20-100 gallons per week	Manually turned; 14-21 days to compost + aerated and curing time

C.5. MUNICIPAL-SCALE COMPOSTING TECHNOLOGIES

1. OVERVIEW

Technologies that could potentially be used at the municipal scale to handle the estimated 68-115 tons per month, or maximum of 1,131 tons per year, of food waste produced and collected[232] were reviewed. Of these, the technologies that seem most likely to meet the substantial amount of food waste produced within the City of Kingston are windrow composting or aerated static pile composting – though the profitability of a composting operation for a municipality the size of Kingston should be

[229] "Compost At Work: On-Site Composting for Businesses in Alameda County." StopWaste.org

[230] "Rocket Composter", Food Waste Experts, https://foodwastexperts.com/rocket-composter. Accessed January 4, 2022.

[231] Griffith, Sharon, et al., Dutchess County Organics.

[232] See "Food Waste Estimates, Municipal Estimate" in this Plan.

further investigated through conversations with local commercial composters. It is worth noting that in the *Dutchess County Organics Recycling Study,*[233] conversations with composting technology vendors led to the conclusion that a municipally operated composting site that processed 230 tons of food waste per year (Scenario 2) would be extremely difficult to operate in a profitable or cost-neutral manner (Task 5.1, page 13), and that municipalities would be better off combining waste between multiple municipalities, or sludge from multiple WWTPs as feedstock in order to reach adequate amounts of volume for an anaerobic digester. It remains to be said, however, that the benefits of organics diversion lie beyond profitability – a municipally run composting site, like a municipal landfill, is a service to residents. Dependent on close management of the site and profitability of compost sales, costs can be reduced to a manageable level.

The other two options considered in this literature review (i.e., in-vessel composting and anaerobic digestion) are more expensive and less scalable for the amount of food waste projected. In-vessel composting has the significant advantage of being relatively odorless and contained, making it more visually and olfactorily appealing if the composting site is located next to or nearby residences. If the spaces or parcels available to Kingston for location of composting sites are limited, in-vessel composting, though still requiring space and aeration for curing, may be of potential interest.

Third-party composting is an attractive option for the initial phase of the composting program, but a literature review led to the conclusion that it is likely that third-party composting will become less cost-effective than other alternatives[234] given the amount of food waste collected in later stages of a City food waste diversion program. While the initial capital investment is low in comparison to the creation of a municipal composting site, ongoing costs associated with haulers and contracting with a third-party composting site may be high. In addition, there may be concerns from nearby available commercial composters if organic waste streams are contaminated with any type of plastic or non-compostable material. The economic feasibility of third-party composting should be determined through a Request for Proposals, developed by the City, to evaluate the costs of commercial haulers and commercial composting according to estimates for the capacity and timing of each phase.

Table 35. Summary Table on Municipal-Scale Composting Technologies' Research provides a summary of the research conducted on municipal-scale composting technologies reviewed. A more detailed discussion on each technology follows.

Table 35. Summary Table on Municipal-Scale Composting Technologies' Research

Type of Composting Process	Capacity	Staff Time Required	Initial Cost	Relative Lifetime Cost	Product
In-Vessel Composting	Contained; High	Medium	Medium-High	Medium-High	Digestate is sludgelike and requires weeks of curing in open area before use and may have low saleability.

[233] Griffith, Sharon, et al., "Dutchess County Organics".

[234] "Village of Rhinebeck Feasibility Study", Village of Rhinebeck: New York State Pollution Prevention Institute, October 31, 2021. http://www.nysp2i.rit.edu.

In-Vessel Electrified Dehydrators	Contained	Medium	High	Medium-High	Least saleable; produces sterilized non-microbial compost that eventually regenerates into compost.
Anaerobic Digestion	Contained; High	Medium	Highest	Medium-High	Most saleable; digestate/fertilizer and biogas.
Windrow Composting	Highest; Scaleable based on available site acreage.	Highest	Low	Low-Medium	Somewhat saleable
Aerated Static Pile Composting	High; slightly less scalable; dependent on piping and electric infrastructure.	Medium-High	Low-Medium	Low-Medium	Somewhat saleable
Third-Party Composting	Dependent on nearby food waste recyclers.	Low	Lowest	Highest; no payback	Often does not belong to municipality after processing.

2. IN-VESSEL COMPOSTING

In-vessel composters are closed containers (vessel reactors) into which materials are placed either in batches or in a continuous stream using front-loading hoppers, or loading conveyors. The closed nature of these systems indicates that they rely on anaerobic digestion rather than aerobic digestion, which means that the compost produced requires aeration and several weeks of time in a maturation bay to cure. Typically, this open-air curing process requires that the compost unloaded from the in-vessel composter be loaded into windrows and aerated (turned) for, at minimum, 21-40 days,[235] after which it requires an additional curing time of at least 21 days. In-vessel composters are closed containers ranging in capacity from 20 gallons per week to 110 cubic yards,[236] capacity and size being dependent on the type and quantity of materials being processed. The primary advantage of in-vessel systems is the greater processing controls for temperature and moisture.[237] Larger systems also require three-phase electric hookup, which can be expensive or difficult to locate. In-vessel systems typically reach and maintain high temperatures quickly, meaning that they can typically accept meat and dairy products and have a relatively faster processing time (1-2 weeks,[238] not including curing time).

[235] "Rocket Composter", Food Waste Experts.

[236] Kopicki, V, et al, "Memorandum: Westchester County Food Waste Study: Report and Initiatives".

[237] "Ulster County Solid Waste Management Plan", 2011.

[238] Griffith, Sharon, et al., "Dutchess County Organics".

Despite the necessity of land area for curing and storage of finished compost, in-vessel composting requires significantly less space than windrow or aerated static pile composting, because of faster processing time and shorter storage, assuming that the final product can be sold across seasons. For reference, an in-vessel system that processes 10,000 gallons of waste a year would require about 2 acres of land.[239] However, due to the contained nature of in-vessel systems, they can be difficult or intensive to scale[240] if not properly sized for the eventual growth of an organics diversion plan. Moreover, most in-vessel systems produce an unfinished compost that must be cured in the open air for several weeks (estimated 3-5 weeks),[241] thus requiring more space than the vessels themselves and necessitating some monitoring and maintenance during the curing process. They may be appropriate for individual large commercial businesses wishing to pursue on-site composting; or again, as stated above, if the municipality has limited space for open-air windrow or aerated static pile composting or concerns about visual aspects or odor of processing material.

3. IN-VESSEL ELECTRIFIED DEHYDRATION COMPOSTERS

There are commercial scale composters that use relatively similar processes to the indoor electric composters above – dehydration, grinding, heating, and cooling of food waste – to produce soil additives. Of these, the only brand available at commercial scale is the FoodCycler. The specifics of those commercial-scale machines are Table 36. In-Vessel Electrified Dehydration Composters – FoodCycler Models, at all available sizes.

Table 36. In-Vessel Electrified Dehydration Composters – FoodCycler Models

MODEL	ES-80	ES-150	ES-300	ES-300 (HYDRAULIC LIFT)	ES-500 (HYDRAULIC LIFT)	ES-1000 (HYDRAULIC LIFT)	ES-1500 (HYDRAULIC LIFT)
MAX VOLUME (L)	80	215	350	350	600	1200	1800
RECOMMENDED VOLUME	60	150	300	300	500	1000	1500
MAX INPUT WEIGHT (LBS)	80	250	400	400	660	1540	2200
APP. PROCESS TIME (HRS)	12-14	12-14	14-16	14-16	16-18	20-22	22-24
UNIT DIMENSIONS (")	36.22 x 29.5 x 44.7	33.4 x 43.3 x 47.2	43.3 x 78.7 x 58.2	43.3 x 78.7 x 58.3	53.1 x 86.6 x 64.9	66.9 x 100.3 x 80.7	90.7 x 78.7 x 78.7
SHIPPING DIMENSIONS (")	42 x 51.9 x 59.2	42 x 51.9 x 59.2	51.9 x 87.3 x 70.2	51.9 x 87.3 x 70.3	61.7 x 95.2 x 78.9	75.5 x 109.9 x 94.7	99.3 x 87.3 x 87.3
UNIT WEIGHT (LBS)	198	639	1400	1400	2755	5247	5800
APP. POWER CONSUMPTION (KWH/CYCLE)	31 ~ 37	62 ~ 72	90 ~ 103	90 ~ 103	170 ~ 190	380 - 420	550 - 610
POWER RATED	4.5 kW / 10A	7.5 kW / 12A	13.5 kW / 18A	13.5 kW / 18A	20 kW / 33A	35 kW / 46A	49.5 kW / 50A
ELECTRICAL REQUIREMENT	220V 60 Hz 3Phase	220V 60 Hz 3Phase	220V 60 Hz 3Phase	220V 60 Hz 3Phase	220V 60 Hz 3Phase	220V 60 Hz 3Phase	220V 60 Hz 3Phase
PRICE (USD)	$ 15, 000	$ 25, 000	$ 41, 500	$ 52, 500	$ 73, 500	$ 134, 500	$ 187, 500

4. ANAEROBIC DIGESTION

Anaerobic digestion, which refers to a specific type of anaerobic decomposition process that occurs in in-vessel systems, is a closed-tank system that produces digestate – a wet mixture rich in nutrients that can be used as a fertilizer – and biogas – composed largely of methane and in small quantities, CO^2 – which can be either sold or flared. The biogas can be cleaned and upgraded to Liquid Natural Gas and injected into the natural gas utility grid, or Compressed Natural Gas, but is more typically used as fuel

[239] Kopicki, V. et al, "Memorandum: Westchester County Food Waste Study: Report and Initiatives".

[240] "Village of Rhinebeck Feasibility Study", Rhinebeck and Pollution Prevention Institute.

[241] Griffith, Sharon, et al, "Dutchess County Organics".

in boilers and Combined Heat and Power (CHP) units.[242] According to the *Dutchess County Organics Recycling Study* (Task 5.1, p 32), "in addition to the costs related to biogas upgrade, policies favor and give credits for electricity generation – not for injecting biogas into natural gas pipelines." Digestate can be directly applied into soils to improve nutrient quality and plant performance, or further processed into pellets or fertilizer and sold.[243] Typically, anaerobic digesters do not accept woody waste, but do accept food scraps, fats and grease, animal manure, and sewage sludge (biosolids).[244] They are often used to compost on-farm waste or sewage sludge from municipal WWTP, including at the Ithaca WWTP, where the biogas produces powers 60% of the facility's energy needs.[245]

Though the capacity for processing food scraps is significant, and less space is required than for an in-vessel system, anaerobic digestion is by far the highest initial cost technology of the municipal-scale composting options reviewed in this section, and ongoing electric costs are high. According to the *Westchester County Food Waste Study*, "the total capital cost to develop an anaerobic digestion facility would be approximately $500-$700/ton (high capital costs, lower labor costs), totaling $5,000,000 to $7,000,000 for a 10,000 ton/year facility. The annual operating cost is estimated to be between $10 and $20 per ton of food waste."[246] In comparison, that same study estimated the initial capital cost of an in-vessel system processing the same amount of waste at "$80-$100/ton or $800,000 to $1,000,000 for a 10,000 ton/year facility. The annual operating cost is estimated to be between $100 and $130 per ton of food waste." However, the outputs of biogas and digestate may be of more value commercially than typical compost,[247/248] and the final digestate can additionally be composted or pelletized to create a product of higher value.[249]

4.1. A. Municipal Anaerobic Digester Case Study: Town of Tusten HORSE AD25 Microdigester

In 2021, the Town of Tusten, in Sullivan County, New York, used a $138,000 NYS DEC-funded MWR&R Capital Projects Grant to purchase a HORSE AD25 Microdigester for use within the Town. This funding was matched with in-kind labor in the setup and operation of the digester, and in the operation of a food rescue project which assisted local food pantries. According to the manufacturer, Impact Bioenergy, the Horse AD series is designed to process food waste at an input rate of 135 pounds per day. In Tusten's experience, the input of 2,000 pounds of food waste led to the production of 100-150 gallons of concentrated liquid fertilizer, which was then diluted 3-4x by local farmers and gardeners for usage in their gardens once approved by the Northeast Organic Farming Association. The HORSE AD25's larger siblings, the Nautilus AS185, and OX AD550, can accept an input rate of 1,000 – 8,200

[242] Griffith, Sharon, et al., "Dutchess County Organics."

[243] "Basic Information about Anaerobic Digestion (AD)," US EPA, REG 03 Overviews and Factsheets, December 10, 2015. https://www.epa.gov/anaerobic-digestion/basic-information-about-anaerobic-digestion-ad.

[244] "Basic Information about Anaerobic Digestion (AD)." US EPA.

[245] Griffith, Sharon, et al., "Dutchess County Organics".

[246] Kopicki, Vincent, et al., "Dutchess County Organics".

[247] Griffith, Sharon, et al., "Dutchess County Organics".

[248] Corden, Caspar, Kastalie Bougas, and David Turer. "Digestate and Compost as Fertilizers: Risk Assessment and Risk Management." European Commission, February 2019. https://ec.europa.eu/environment/chemicals/reach/pdf/40039%20Digestate%20and%20Compost%20RMOA%20-%20Final%20report%20i2_20190208.pdf.

[249] Koenig, Brooke and Greg Kleinheinz, "Comparison of Compost Efficiency of Digestate to Undigested Organic Waste from a Dry Anaerobic Digester," 2017. https://www.wisconsin.edu/waste-research/download/2014_student_reports/14%20OSH%20Koenig%20composting%20digestate.pdf.

lbs/day and 20-180 tons per month of food and brown waste, respectively. Impact Bioenergy also provides assistance with seeding the digester with initial microbes and digestate, and then answers maintenance questions when they arise.

Tusten has used the digester twice, once in the fall of 2021 and the spring of 2022, to prove that it produces a high-quality fertilizer product that is immediately useful to local farmers and customers. In this manner, they began to market the digestate and educate the Town residents about opportunities to reduce landfilled food waste. In total, through residential drop-off and some restaurant drop-off of food waste, they collected 2-4 tons of food waste, and produced around 300 gallons of the undiluted digestate. The biogas produced (largely pure methane) was routed directly to a small local generator for combustion. The digester itself possesses a small flare for excess biogas.

Should the City of Kingston be interested in the purchase and usage of a digester similar to the Nautilus AS185 or OXAD550, both of which are sized to be more useful to a municipality of 30,000 people, Tusten can provide a few lessons learned. First, the in-vessel nature of the digester eliminates concerns about odor that may be present at a number of potential large-scale sites within the City's boundaries. Second, the digester itself will require staffing – both to ensure effective collection or drop-off of food waste, and to ensure the sale of what has proven to be a valuable digestate product, and potentially the biogas as well, though markets remain at initial stages. And third, the digester is more than a product – it is also a learning and educational opportunity that can provide additional value to the community and the surrounding area.

5. WINDROW COMPOSTING

Windrow composting involves layering organic waste into long piles, which are turned periodically to form other windrows, resulting in multiple long rows of waste at various stages of composting. Because of the size of these piles (between 6-12 feet in height and 10-20 feet in width, depending on the type and density of material in the pile)[250] and the necessity of inserting enough space between them to allow the use of skid steer or front-end loader turning equipment, this is roughly twice as space-intensive as aerated static pile composting[251]. In cold climates, piles can be insulated with straw or finished compost in the winter to retain heat and act as a biofilter, but the internal temperature of the pile is maintained by the sheer volume. Given that windrows rely on their own volume to maintain internal heat for the composting process, they are only able to compost meats and dairy at adequate volume.[252] Leachate must be captured and collected in order to ensure that water is not contaminated,[253] and odor must be controlled, ideally through site design, location, and effective drainage,[254] as odor is usually generated through moisture pooling. Setbacks should also be observed – New York law requires a setback of 200 feet from residences or places of business for source-separated organics or yard trimmings, and 500 feet for any other type of waste; as well as a 200 feet setback from any nearby potable water bodies independent of feed material type (6 CRR-NY 361-3.2).

[250] Chardoul, Nicole, et al., "Compost Operator".

[251] Chardoul, Nicole, et al., "Compost Operator".

[252] "Types of Composting and Understanding the Process", US EPA, OLEM Overviews and Factsheets, August 19, 2015. https://www.epa.gov/sustainable-management-food/types-composting-and-understanding-process.

[253] US EPA, OLEM, "Types of Composting and Understanding the Process."

[254] Chardoul, Nicole, et al., "Compost Operator".

Typically, labor is required both to build the windrows, and to turn them and monitor their internal temperature. This involves both labor costs and capital costs (i.e., front-end loaders or bucket turners on tractors, and potentially chippers or grinders). However, this is the easiest composting method to scale – as long as there is land available, longer windrows or additional windrows can be built. Volume should not exceed 5,000 cubic yards per acre at any point during the annual rotation of active composting, curing and storage[255]. Typically, the staging and receiving area takes up about 20-30% of the total area needed, the active composting area takes up 50-60%, and the storage area takes up 10-20%.[256] Windrow composting, though easy to scale, does require more processing time (3-9 weeks turning, plus 3-4 weeks for curing of compost[257]) than aerated static pile composting, hence necessitating additional area for active composting.

6. AERATED STATIC PILE (ASP) COMPOSTING

Aerated static pile (ASP) composting uses forced air to aerate the compost pile. Organic materials, including a bulking agent, are layered on top of a set of perforated pipes connected to a blower which either pushes or pulls air through the compost pile, eliminating the need for aeration by manual turning. The blowers typically monitor temperature and adjust accordingly – active composting occurs within the 55°C – 155°C range, but temperatures above 140°C create negative conditions for aerobic digestion.[258] Aerated static piles are rarely used to compost food waste alone but rather used to compost animal manure,[259]biosolids or feedstock with similar characteristics.[260] They cannot process grease from food processing, but can accept food scraps. The type of bulking agent used is particularly important in this methodology,[261] because the bulking agent must create pockets for air to flow through given that manual turning does not occur. Typically, wood chips are used but not entirely degraded by the process, then sieved from the finished compost and reused for 2-3 more composting cycles. Animal by-products cannot be accepted, but applying a thick layer of finished compost over the piles reduces the likelihood of problems with odor.[262] That layer of finished compost serves multiple functions: it insulates the piles, acts as a biofilter, reduces nitrogen and VOC emissions, and reduces nutrient and moisture loss.[263] Even with the insulation provided by this layer, in cold climates, it can be better to place aerated static piles indoors or under shelter, because freezing of material and cold conditions throughout the pile may make aeration difficult.[264] In dry climates, it may be necessary to use a water truck to add moisture to the piles.[265]

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[255] Chardoul, Nicole, et al., “Compost Operator”.

[256] Chardoul, Nicole, et al., “Compost Operator”.

[257] Griffith, Sharon, et al., “Compost Operator”.

[258] Griffith, Sharon, et al., “Compost Operator”.

[259] “Types of Composting and Understanding the Process.” EPA Overviews and Factsheets.

[260] Griffith, Sharon, et al., “Dutchess County Organics”.

[261] Griffith, Sharon, et al., “Dutchess County Organics”.

[262] “Types of Composting and Understanding the Process”, EPA Overviews and Factsheets.

[263] O2Compost, “Aerated Static Pile Compost Pilot Project and Operator Training Program for the City of Walla Walla, Washington”, State of Washington Department of Ecology and City of Walla Walla, 2015. http://www.o2compost.com/Userfiles/PDF/Walla-Walla-ASP-Pilot-Project-Final-Report-06-29-15.pdf.

[264] “Types of Composting and Understanding the Process”, EPA Overviews and Factsheets.

[265] O2Compost, “Aerated Static Pile Compost Pilot Project and Operator Training Program For the City of Walla Walla, Washington.”

According to the *Dutchess County Organics Recycling Study* (p. 16), it takes three to five weeks for waste to compost in aerated static pile composting, with a curing stage of another three to four weeks.[266] Other estimates vary. According to the *District of Columbia Compost Feasibility Study* (p. 17), aerated static pile composting requires four to six months for the total process.[267] However, both studies, and other sources, agree that it is considerably faster than windrow composting. It is also less labor-intensive, given that aerated static pile composting does not rely on monitoring and manual turning. The lack of turning equipment eliminates the need for turning lanes, reducing the total area necessary for a successful composting operation significantly. Under space-limited conditions, ASP can increase the flow-through capacity of composted materials significantly in comparison to windrow composting.[268] For incremental increases in volume, piles can be extended, and additional perforated pipe length added.

7. COMPARISON OF AERATED STATIC PILE COMPOSTING AND WINDROW COMPOSTING

Windrow composting, though more labor-intensive than in-vessel composting or aerated static pile composting, is fairly low-tech and may have the benefit of lower capital expense than aerated static pile composting or in-vessel composting at large scale,[269/270] but does require a longer processing time than aerated static pile composting, the provision of adequate material, and considerably more labor in turning, monitoring temperature, and maintaining the piles.[271] Given the capital costs of the blowers, pipes, sensors, fans, and shelter for the compost,[272] the *Dutchess County Organics Recycling Study* costs estimated aerated static pile composting costs at roughly half the costs of in-vessel composting[273] – higher than windrow composting, but also without the necessity of quite as much labor. According to the *Westchester County Food Waste Study*, "Excluding land costs, the total capital cost to develop a windrow composting facility is approximately $50-$70/ton or $500,000 to $700,000 for a 10,000 ton/year facility. The annual operating expense is estimated to be between $15 and $20 per ton of compost stored at the facility." That report does not consider the costs of aerated static pile composting.

However, in the *Village of Rhinebeck Feasibility Study* Appendix A, the NYS P2I notes that windrow composting is unsuitable for the Rhinebeck Composting Pilot, at 1.7 tons of food waste per week,[274] and estimated that aerated static pile composting would be relatively cheaper for their 1.7 ton/week pilot over a 30-year period (median $100,000) than turned windrow composting (median $125,000).[275] In addition, the City of Walla Walla (population of approximately 31,000) Washington's study

[266] Griffith, Sharon, et al., "Dutchess County Organics".

[267] RRS, "District of Columbia Compost Feasibility Study", District of Columbia Department of Public Works, April 2017. https://dpw.dc.gov/compostfeasibilitystudy.

[268] O2Compost, "Aerated Static Pile Compost Pilot Project and Operator Training Program For the City of Walla Walla, Washington."

[269] Griffith, Sharon, et al., "Dutchess County Organics".

[270] "Village of Rhinebeck Feasibility Study", Village of Rhinebeck and Pollution Prevention Institute.

[271] "Compost At Work: On-Site Composting for Businesses in Alameda County."

[272] "Types of Composting and Understanding the Process", US EPA Overviews and Factsheets.

[273] Griffith, Sharon, et al., "Dutchess County Organics".

[274] "Village of Rhinebeck Feasibility Study", Village of Rhinebeck and Pollution Prevention Institute.

[275] "Village of Rhinebeck Feasibility Study", Village of Rhinebeck and Pollution Prevention Institute.

determined that due to labor and equipment costs, as well as shorter processing times for ASP, aerated static pile composting costs would be roughly half of what the costs of their current turned windrow operation.[276] The same study estimated that for a composting operation handling 6,000 cubic yards per year, turned windrows would require 480 labor hours (half turning, half watering the rows with a water truck), while aerated static piles would require 240 hours. The District of Columbia, estimating their potential diversion at between 10,000 and 40,000 tons per year, also chose to pursue aerated static pile composting, citing cost efficiency and simplicity.[277] If the City of Kingston, which has a population ten times the size of Rhinebeck but roughly equivalent to the City of Walla Walla, initiates a pilot or phase-in composting program, it may make more sense to pursue aerated static pile composting in initial stages. Comparing these studies, it appears that windrow composting may reach economies of scale at larger quantities, and aerated static pile composting may be more economically efficient for smaller quantities.

8. THIRD-PARTY COMPOSTING

According to the *Village of Rhinebeck Feasibility Study*, hauler costs would likely amount to roughly $155-175 per ton per month. As a rough cost comparison based on municipal food waste estimates developed as a part of this study, the City's monthly cost for the 68-115 tons per month of estimated food waste could cost $10,540 to $20,125 per month (equivalent to $126,480 - $241,500 annually). As noted in "Haulers" in this Plan, available haulers can provide a cost estimate for food scraps collection services upon the City of Kingston's issuance of a Request for Proposals; it is anticipated that bulk collection will bring down prices with economies of scale.

Third-party composting option could be included as part of the phased-in growth of the City of Kingston organics recovery process, but according to this literature review, would likely become cost-prohibitive in later stages. To determine costs, it's necessary to have an accurate estimate for the amount of food scraps and brown waste that will be collected by the City at each stage, and a plan for the incremental phasing-up of that collection. It is important to note that some haulers and third-party composting sites may not accept meat or dairy products, and that contamination with plastic waste will increase costs.

D. KINGSTON COMPOSTING SITE ANALYSIS

D.1. BACKGROUND

Select parcels in the City of Kingston were assessed for their viability for composting-related activities in tandem with a food waste collection program. Parcels were assessed for their viability for neighborhood composting, compost distribution, large-scale composting as well as a combination of these activities; neighborhood composting activities include on-site community composting and food waste drop-off locations. Parcels included in the analysis were identified from three sources: maps from the City's Natural Resources Inventory,[278] the 2019 Final Assessment Roll,[279] and the Ulster

[276] O2Compost, "Aerated Static Pile Compost Pilot Project and Operator Training Program for the City of Walla Walla, Washington".

[277] RRS, "District of Columbia Compost Feasibility Study".

[278] John Mickelson, *City of Kingston, NY: Natural Resources Inventory*, 2016. https://kingston-ny.gov/nri.

[279] "Kingston 2019 Final Assessment Roll", Ulster County, https://ulstercountyny.gov/real-property/assessment-rolls. Accessed June 2020.

County Parcel Viewer.[280] For certain parcels where ownership or contiguity were unclear, or parcel size needed to be estimated, the Ulster County Tax Maps[281] were also consulted. A total of 58 parcels in the City were assessed. A number of these parcels, when combined, represent a single-use location, such as Hutton Park, which is comprised of two parcels.

D.2. OVERVIEW

A comprehensive review of the 58 parcels and input from the DPW Superintendent Ed Norman and Deputy Superintendent Ryan Coon revealed that a number of parcels were viable for various uses: neighborhood composting, food waste drop-ff and/or compost distribution, and small-scale uses. No parcels/locations were ultimately determined to be viable for large-scale composting operations. Table 37. City of Kingston Parcels Assessed provides the rationale for each identified use related to specific parcels / locations in the Local Knowledge Notes column. In total, 23 parcels, constituting 18 locations were determined to be viable locations for the previously noted uses.

D.3. RECOMMENDATIONS ON COMPOSTING SITES IN KINGSTON

- **The City should continue to reassess locations deemed unfeasible for an extended aerated static pile composting system.** A number of sites considered were of sufficient size for an EASP system, but were eliminated from consideration due to conflicts with nearby land uses. Overtime, should those land uses no long present a conflict and should the composting facility relationship prove to be financially or logistically challenging, it would be beneficial for the City to be prepared with an alternative location for a municipally managed composting facility. Recent recommendations from the NYS DEC are encouraging municipally managed composting facility.
- **The City should unveil locations suitable for composting-related activities as part of its food waste collection program.** Eighteen locations were identified as suitable for neighborhood composting, food waste drop-off, and/or compost distribution. The locations are distributed throughout the City in all but two of the least populated wards and are accessible to the various ethnic groups that reside in the City. Locations such as these allow for the reinforcement of the existing sense of community. All locations were determined to be accessible by DPW and/or Park & Rec vehicles.
- **The City should engage local, experienced companies in establishing neighborhood composting and food waste drop-off sites.** Both efforts require engagement with community members and experience with the logistics of establishing these composting related activities. A local small-scale hauler, CCC, has significant experience with both activities. Royal Carting Service Company and C.R.P. Sanitation are available to provide food waste collection from drop-off sites, but the City would still need expertise in establishing the community and volunteers needed for well managed neighborhood composting and drop-off sites.

D.4. PARCELS ASSESSED

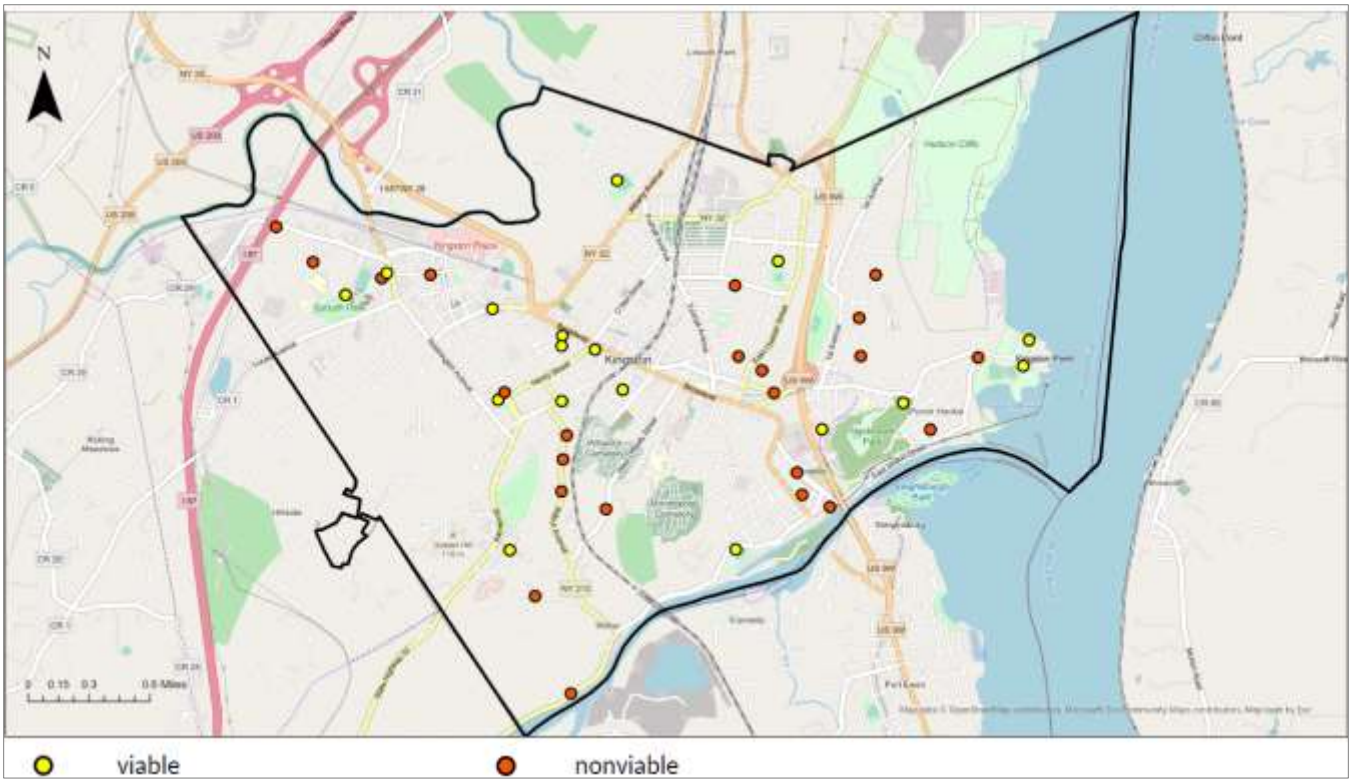
Table 37. City of Kingston Parcels Assessed provides a listing of the 59 parcels included in this analysis that comprise 41 locations; parcels associated with the same location are shown together in highlighted pale and darker blue. The locations are graphically represented in Map 1. City of Kingston

[280] "Ulster County Parcel Viewer", Ulster County, https://ulstercountyny.gov/maps/parcel-viewer/. Accessed June 2020.

[281] "Ulster County Tax Maps", Ulster County, https://ulstercountyny.gov/real-property/tax-maps. Accessed June 2020.

Locations Examined for Composting, with differentiation between those that were determined to be viable and nonviable.

Map 1. City of Kingston Locations Examined for Composting



The initial identification of parcels for consideration focused on those owned by the City as this ownership would allow for the greatest flexibility around potential uses. City-owned parcels accounted for 55 parcels, one owned by the Kingston City School District, and three owned by two private entities. Parcels were then assessed for their viability for composting-related activities, first by the City's Sustainability Coordinator and then by Superintendent Norman and Deputy Superintendent Coon.

The data collected as part of this assessment process is shown in Table 37; the specific data points are described below.

- Parcel Number: Most parcel numbers were taken from the Kingston 2019 Final Assessment Roll, with a few provided through the Ulster County Parcel Viewer.
- Owner of Record: Information on the owner of record was also pulled from the Assessment Roll and Parcel Viewer. For two parcels, the owner of record was either missing or did not match between the two parcel list sources. This discrepancy was noted in the Notes section.
- Local Name: Parcels were grouped when adjacent or when part of a known location, such as Wilbur Avenue Complex. Local names were added, such as Kingston Point Park. The groupings resulted in 41 locations.
- Ward: The ward location of parcels was also identified to ensure that neighborhood composting activities would be equitably distributed throughout the City.
- Address: Known addresses were taken from Assessment Roll or Parcel Viewer.

- Property Class: Property classes were taken from Assessment Roll or Parcel Viewer. Property classes excluded from consideration included auditorium, bar, cultural building, family residential, government, highway garage, parking lot (including government parking lot), police/fire, restaurant, sewage, solid waste, vacant commercial, and water supply.
- Adjacency to Residential Development: Parcels were categorized by their adjacency to residential development. Those that were determined to be too close to residences were excluded from possible composting-related activities. The categories used included "none" for no residential development, "few" for parcels in proximity to some sparse residential development, "many" for parcels adjacent to residential development outside of the City center, and "dense" for those parcels identified within the City grid. The assigned categories were identified using Google Maps satellite view and by the City's Sustainability Coordinator.
- Acreage: Parcel acreage was taken from either Assessment Roll or Parcel Viewer. In a few cases, the Parcel View measurement tool was used to determine the parcel acreage.
- Notes: Each parcel was assessed for its viability for potential composting activities. The rationale informing the potential uses identified for a site is provided. Acreage and adjacency to residential development were considered in determining potential uses. For example, many parcels were determined to have no viable composting activity uses due to their small size.
- Potential Use: The potential uses identified were informed by the data collected as well as input from the Sustainability Coordinator and DPW staff. Use options included neighborhood composting, food waste drop-off and/or compost distribution, large-scale composting as well as a combination of these activities; neighborhood composting activities include on-site community composting and food waste drop-off locations. Potential use options were categorized as noted below. None of the parcels assessed were determined to be viable for large-scale composting.
    - "a) neighborhood composting": For those locations determined to be viable for on-site community composting and food waste drop-off locations.
    - "b) food waste drop-off and/or compost distribution": For those locations determined to be best suitable as food waste drop-off locations and/or distribution points for finished compost.
    - "c) small-scale uses": For those locations determined to be viable for all of the above small-scale uses.
    - "d) none": For those locations determined to be nonviable for any composting activities.

Property classes excluded from Table 37. City of Kingston Parcels Assessed include auditorium, bar, cultural building, family residential, government, highway garage, parking lot (including government parking lot), police/fire, restaurant, sewage, solid waste, vacant commercial, and water supply. The table is sorted by Potential Use, Known As, Street Name, and Street #. Sources consulted included the Kingston 2019 Final Assessment Roll (https://ulstercountyny.gov/real-property/assessment-rolls), Ulster County Parcel Viewer (https://ulstercountyny.gov/maps/parcel-viewer/), and Ulster County Tax Maps (https://ulstercountyny.gov/real-property/tax-maps).

Table 37. City of Kingston Parcels Assessed

Parcel	Owner	Known As	Street #	Dir.	Street Name	ResAdj	Acres	Local Knowledge Notes	Potential Uses
56.93-2-22	City Of Kingston	Van Buren St Playground	45		Vanburen St	d) dense	0.08	Site determined to not be feasible as a food waste drop-off location due to very narrow roads that would make collection by truck difficult. Site suitable as a community composting location. Acreage determined using Ulster County Parcel Viewer.	a) neighborhood composting
56.93-2-23.100	City Of Kingston	Van Buren St Playground	47		Vanburen St	d) dense	0.06	Site determined to not be feasible as a food waste drop-off location due to very narrow roads that would make collection by truck difficult. Site suitable as a community composting location. Acreage determined using Ulster County Parcel Viewer.	a) neighborhood composting
56.93-2-23.200	City Of Kingston	Van Buren St Playground	49		Vanburen St	d) dense	0.06	Site determined to not be feasible as a food waste drop-off location due to very narrow roads that would make collection by truck difficult. Site suitable as a community composting location. Acreage determined using Ulster County Parcel Viewer.	a) neighborhood composting
48.80-1-30	City Of Kingston	Academy Green	2-50		Albany Ave	d) dense	1.30	A large centrally located median, primary use as a passive park. Parking would be an issue. Lower priority.	b) food waste drop-off and/or compost distribution
56.33-2-19.100	City of Kingston	Barmann Park	2-36R	S	Prospect St	c) many	1.70	Determined to be only suitable as a food scraps drop-off location or compost distribution, but not community composting.	b) food waste drop-off and/or compost distribution
56.50-6-12	City Of Kingston	Block Park	208-304		Abeel St	b) few	7.10	Park parcel, subject to flooding. Primary use is for softball. Determined to be suitable for compost distribution and as a drop-off location.	b) food waste drop-off and/or compost distribution
56.109-3-16	City of Kingston	Broadway Commons	615		Broadway	d) dense	3.24	Prime real estate location being pursued by City for development. Centrally located. Use in short term was determined to be feasible, particularly as a drop-off location and for compost distribution.	b) food waste drop-off and/or compost distribution
48.79-1-2.100	City Of Kingston	Dietz Stadium	170	N	Front St	d) dense	12.10	Location hosts many events with large attendance. Determined to have no room for community composting, but viable for compost distribution and as a drop-off location. Undergoing $20 million renovation	b) food waste drop-off and/or compost distribution
56.92-3-23	City Of Kingston	Everette Hodge Center Children's Garden	21		Franklin St	d) dense		Known address is listed as 15-21 Franklin St. Location was determined to be viable for compost distribution and as a drop-off site, particularly with use of private parking lot across the street. If parking lot is in use, compost distribution hours would need to be timed to hours when use is minimal.	b) food waste drop-off and/or compost distribution
56.35-3-3	City Of Kingston	Fourth Ward Memorial Park	227-241		Hasbrouck Ave		1.00	This site is a roadside monument site with a parking area. Determined to be viable as a drop-off site.	b) food waste drop-off and/or compost distribution
56.35-9-16.100	City Of Kingston	Hasbrouck Park	375-405& R		Delaware Ave	c) many	45.30	The park is a known, active recreational use location. It is a large parcel with poor access given road width (i.e., width of a driveway); it is adjacent to a school. The lower section of the lot, however, is large and accessible. Determined to be suitable for food waste drop-off and compost distribution. There is a former tree nursery that would need to be cleared and could be used for community composting. Use of the school parking lot would be required to make it most accessible as a food waste drop-off site. Approximately 90% is either forested or an active recreational facility.	b) food waste drop-off and/or compost distribution

56.35-9-16.200	City Of Kingston	Hasbrouck Park	375-405& R		Delaware Ave	c) many		The park is a known, active recreational use location. It is a large parcel with poor access given road width (i.e., width of a driveway); it is adjacent to a school. The lower section of the lot, however, is large and accessible. Determined to be suitable for food waste drop-off and compost distribution. There is a former tree nursery that would need to be cleared and could be used for community composting. Use of the school parking lot would be required to make it most accessible as a food waste drop-off site. Approximately 90% is either forested or an active recreational facility.	b) food waste drop-off and/or compost distribution
48.82-9-24.100	City Of Kingston	Hutton Park	2-50		Sherman St	c) many	3.50	Confirmed that legal address is not on Grant Street. Determined to be suitable for compost distribution or food scraps drop-off. A neighborhood park; it is wide and open. Site visit revealed that access is a challenge as there is no off-street parking nor does it have good access points for trucks. It is centrally located and has adequate drive through capabilities.	b) food waste drop-off and/or compost distribution
48.82-9-32	City Of Kingston	Hutton Park	116-126		Vangaasbeck St	c) many	2.50	Site visit revealed that Grant Street provides the best access; a small street off of Sylvester, parallel to Sherman St., is also available. Neighbors' reactions are a concern. Determined to be suitable as a compost distribution location. No formal parking is available.	b) food waste drop-off and/or compost distribution
48.79-1-4	City Of Kingston	Forsyth Park	125		Lucas Ave	b) few	18.60	Determined to be a viable composting demonstration location for composting of food waste produced onsite. In June 2020 the site had a 3-bay composting system. This parcel is accessible to Dietz Stadium Complex and is viable as a food waste drop-off and compost distribution location. Unusual smells do not present an issue.	c) small-scale uses
56.124-1-1	City Sch Dis	George Washington Elementary School (aka GW Montessori)	67		Wall St	d) dense	4.70	Determined to be viable as a demonstration location for food waste drop-off, neighborhood composting, and compost distribution. There is a community garden onsite that leases garden plots, but it is unclear on how active the garden is. The parcel is centrally located in a community with a large Hispanic population.	c) small-scale uses
57.21-1-14	City Of Kingston	Kingston Point Beach	66-106		Delaware Ave	a) none	10.57	A waterfront destination that is known for recreational activities and will remain a park in perpetuity. Both community composting and drop-off activities would need to take into account high water table and flooding that takes place at least six times a year to a depth of approximately one foot. Brick covering is prevalent. The City is currently overhauling the location, which is remote and accessible by MSW trucks. Easily accessible to residents and receives over 100 visitors per day. Animals may be a concern. Permanent storage sheds could hold finished compost for later distribution.	c) small-scale uses
57.21-1-2	City Of Kingston	Kingston Point Park	41		Delaware Ave	a) none	0.00	Park known for recreational activities. See entry for Kingston Point Beach.	c) small-scale uses
56.36-1-34	City of Kingston	Kingston Point Park	53		Delaware Ave	a) none	84.70	Park known for recreational activities. See entry for Kingston Point Beach.	c) small-scale uses
57.21-1-5	City Of Kingston	Kingston Point Park			Land at Kingston Point	a) none	2.10	Park known for recreational activities. See entry for Kingston Point Beach.	c) small-scale uses
48.73-3-10.100	City Of Kingston	Loughran Park	50		Charlotte St	d) dense	7.50	Located in the middle of a dense neighborhood. Determined to be suitable for food scraps drop-off or compost distribution. Nearly entire space is programmed leaving minimal space for community composting, though area to west of basketball court could be considered.	c) small-scale uses
56.35-9-20	City Of Kingston	Rondout Community Garden	100-112		Murray St	d) dense	1.70	Right on a highway, very accessible and visible, with available space. Determined to be a viable location for food waste drop-off, community composting, and compost distribution.	c) small-scale uses
56.48-2-13	City Of Kingston	Transfer Station	1-31		Condie St	a) none	8.60	Parcel address commonly known as 69 Albert Street, although Condie Street address appears in the Ulster County Parcel Viewer and Final Assessment Roll. Parcel is used as City's Transfer Station and currently serves as all yard waste collection storage and management. DPW staff noted that the 3.5 acres previously considered for large-scale composting would be unfeasible due to steep drop-off on two sides. Site visit revealed that reducing the acreage to approximately 2.09 acres would address the drop-off issue, but would leave minimal room for equipment maneuvering give location configuration. Site determined to be adequate for food waste drop-off, neighborhood composting, and compost distribution.	c) small-scale uses

56.25-5-9	YMCA of Kingston	YMCA Community Garden	1-11		Summer St	b) few	1.80	Determined to be suitable as food waste drop-off location, community composting, and compost distribution.	c) small-scale uses
48.79-1-2.200	City Of Kingston	Andretta Pool	76	N	Front St		1.40	Determined to not be viable for any composting activities due to its active recreational use.	d) none
56.49-1-8	City Of Kingston	Clearwater Park	93-111		Chapel St		1.80	Former park, no longer maintained as a park. Now just woods. Determined to have no viable composting activity uses.	d) none
56.43-4-35	City Of Kingston	Cornell Park	1-39		Hunter St	d) dense	2.00	Has no active programing, just a large open space. Often underutilized with no readily available parking. Community composting possible in lower half of parcel that is an unused field. A site visit revealed that: access is a challenge for the park, there is no off-street parking nor adequate location for food waste collection or drop-off by trucks. It is centrally located and has adequate drive through capabilities. Determined to have no viable composting activity uses.	d) none
48.16-5-11	City of Kingston	First Avenue Yard	514-520		First Ave	b) few	0.63	This parcel has a number of uses. It is located in a neighborhood with few houses, although concerns have been raised about the current uses. Large trucks already travel this road as the site is used for debris disposal. Acreage determined using Ulster County Parcel Viewer. While viable for small-scale uses, determined to not be viable for any composting activities due to small size and low residential density.	d) none
48.16-5-10	City of Kingston	First Avenue Yard	522-528		First Ave	b) few	0.60	This parcel has a number of uses. It is located in a neighborhood with few houses, although concerns have been raised about the current uses. Large trucks already travel this road as the site is used for debris disposal. Acreage determined using Ulster County Parcel Viewer. While viable for small-scale uses, determined to not be viable for any composting activities due to small size and low residential density.	d) none
48.331-1-1	City Of Kingston	Peace Park	60-62	N	Front St		0.08	Determined to be too small for any composting activities.	d) none
56.36-11-6	City Of Kingston	Rickel Knox Park	20-24		Gill St		0.06	Determined to be too small for any composting activities.	d) none
56.35-2-43	City Of Kingston	Rondout Neighborhood Center	103		Broadway	d) dense	0.05	A site visit revealed that although the Center is on a principal road, its location is awkward and makes pulling up for compost distribution difficult. No other uses were determined to be viable.	d) none
56.27-2-1	City Of Kingston	Schultz Park aka Rt. 9W Ballfield	2-66		Highland Ave	d) dense	18.70	This City-owned park is managed by a little league group that uses the entire, fenced-off property. Determined to be difficult to access and only used by those who are aware of its location.	d) none
56.33-2-30	City Of Kingston	Wilbur Avenue Complex	376-378		Wilbur Ave	b) few	0.18	Parcel surrounded by 56.41-2-28. Determined to not be suitable for composting activities due to location of senior living facility across the street and DEC site use restrictions. Known public works yard. Location of former City refuse incinerator.	d) none
56.33-2-28	City Of Kingston	Wilbur Avenue Complex	380-392		Wilbur Ave	b) few	2.00	Parcel does not appear on Ulster County Parcel Viewer but was found on Final Assessment Roll. Determined to not be suitable for composting activities due to location of senior living facility across the street and DEC site use restrictions. Known public works yard. Location of former City refuse incinerator.	d) none
56.33-2-25.100	City Of Kingston	Wilbur Avenue Complex	426		Wilbur Ave	b) few	2.90	Final Assessment Roll states "Added 394-458"; adjacent to 56.41-2-28. City owned and fully operational with 15+ staff. Determined to not be suitable for composting activities due to location of senior living facility across the street and DEC site use restrictions. Known public works yard. Location of former City refuse incinerator.	d) none

56.41-2-28	City of Kingston	Wilbur Avenue Complex			Wilbur Ave	b) few	2.27	Parcel does not appear on Final Assessment Roll but was found in the Ulster County Parcel Viewer, although without ownership information. The Assessment Roll lists it as City owned, but the Official Ulster Count Tax Map lists the owner as NYS Realty & Terminal Co. Area is currently used as City DPW yard. Acreage calculated with the Parcel Viewer measurement tool. Determined to not be suitable for composting activities due to location of senior living facility across the street and DEC site use restrictions. Known public works yard. Location of former City refuse incinerator.	d) none
56.41-1-5.100	City of Kingston		327-349		Wilbur Ave		1.20	Determined to not be suitable for composting activities due to stream and riparian area.	d) none
56.43-5-41	City Of Kingston		1-3		Canal St		0.00	Determined to be too small for any composting activities.	d) none
56.27-6-36	City of Kingston		68-70		Elm St		0.00	Determined to be too small for any composting activities.	d) none
56.27-6-37	City of Kingston		72-76		Elm St		0.22	Determined to be too small for any composting activities.	d) none
48.82-6-71	City Of Kingston		23-29 R		Florence St		0.00	Water tower on site. Determined to be unsuitable for any composting activities.	d) none
56.26-3-22	City Of Kingston		134		Highland Ave		0.02	Parcel is a median. Determined to be unsuitable for any composting activities.	d) none
48.78-2-6	City of Kingston		10-24 R		Howland Ave		0.85	Determined to be too small for any composting activities.	d) none
48.78-1-4	City of Kingston		240-256 R		Hurley Ave	c) many	14.40	Parcel determined to not be viable for any composting activities due to residential properties located to the east, the Thruway to the west, and its narrowness with steep slopes from a rock outcrop along the entire length.	d) none
56.28-2-15	City Of Kingston		126-132		North St		0.05	Parcel is site of City pump station and determined to be too small for any composting activities.	d) none
56.41-2-21	City of Kingston		283	W	Oreilly St	b) few	0.85	Determined to not be suitable for composting activities due to nearby residences.	d) none
56.57-1-4	City of Kingston		2-20		Purvis St		0.03	Determined to be too small for any composting activities.	d) none
56.43-5-38	City Of Kingston		16-20	W	Strand St		0.00	Parcel is a median. Determined to be unsuitable for any composting activities.	d) none
56.43-5-37	City Of Kingston		22	W	Strand St		0.10	Parcel is a median. Determined to be unsuitable for any composting activities.	d) none
56.43-5-36	City Of Kingston		24-26	W	Strand St		0.00	Parcel is a median. Determined to be unsuitable for any composting activities.	d) none
48.83-7-35	City of Kingston		151		Third Ave		0.00	Determined to be too small for any composting activities.	d) none
48.83-6-10	City of Kingston		250-256 R		Third Ave		1.50	Parcel is largely wooded with wetlands. Determined to be unsuitable for any composting activities.	d) none
56.41-1-10.110	City of Kingston		58-64	S	Wall St		1.00	Determined to not be suitable for composting activities due to stream and riparian area.	d) none
56.41-1-12.100	City of Kingston		66-110	S	Wall St		3.60	Determined to not be suitable for composting activities due to stream and riparian area.	d) none
56.41-1-13	City of Kingston		112-126	S	Wall St		0.00	Determined to not be suitable for composting activities due to stream and riparian area.	d) none
56.41-1-14	City of Kingston		128	S	Wall St		0.06	Determined to not be suitable for composting activities due to stream and riparian area.	d) none
56.41-1-15	City of Kingston		130	S	Wall St		0.06	Determined to not be suitable for composting activities due to stream and riparian area.	d) none

D.5. PARCELS VIABLE FOR COMPOSTING-RELATED ACTIVITIES

This section provides data and graphic representations of the locations identified as being suitable for composting-related activities. Locations are discussed in terms of their distribution in relationship to wards and demographic data. The demographic maps were developed using PolicyMap,[282] a mapping and analytics platform.

Map 2. City of Kingston Locations Viable for Composting-Related Activities

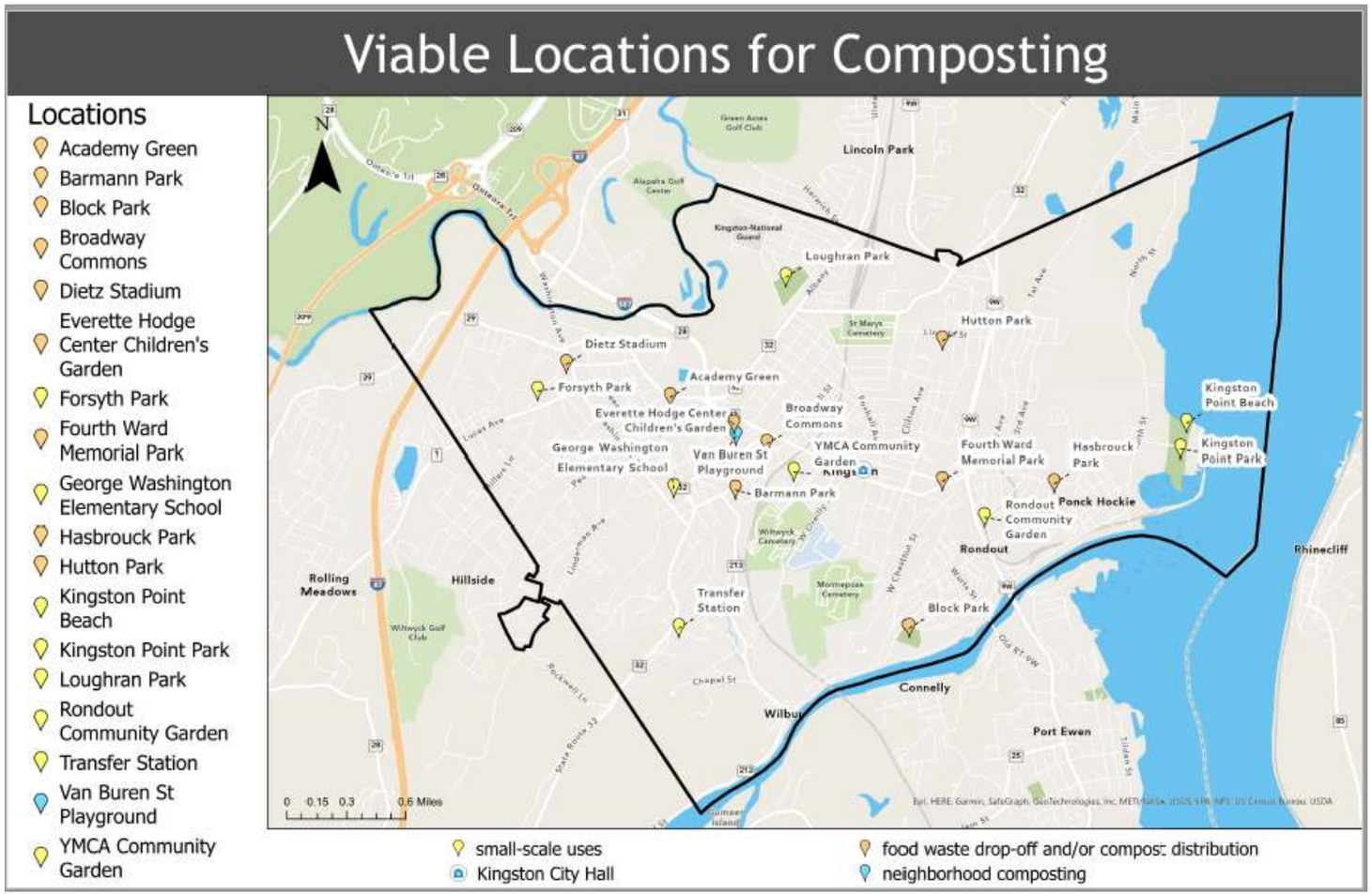


Table 37. City of Kingston Parcels Assessed 23 parcels, comprising 18 locations, that were determined to be viable for composting-related activities, listed in the Potential Use column as a) neighborhood composting, b) food waste drop-off and/or compost distribution, c) small-scale uses, and d) none. Map 2. City of Kingston Locations Viable for Composting-Related Activities shows the geographic distribution of locations identified for uses a thru c. One location was determined to be viable for neighborhood composting activities, nine locations for food waste drop-off and/or finished compost distribution, and eight for both neighborhood composting and food waste drop-off and/or finished compost distribution.

[282] PolicyMap, https://www.policymap.com/. Accessed October 2021. PolicyMap began as a division of Reinvestment Fund, a community development financial institution.

1. LOCATIONS ASSESSED FOR LARGE-SCALE COMPOSTING

The City's food waste production, detailed in "Food Waste Estimates, Municipal Estimates", was estimated as requiring a minimum of 1.35 acres to meet the operating needs to process the City's projected food waste using the aerated static pile method from collection and processing to curing and holding for distribution. Larger City-owned parcels were assessed for their viability to serve as locations for large-scale composting. An initial analysis identified the locations listed in Table 38. Locations Assessed for Large-Scale Composting. After a full vetting by DPW staff and further site analysis by the City's Sustainability Coordinator and HVRC, all locations were determined to be unsuitable for large-scale composting operations. The reasons for the determinations are explained in the Local Knowledge Notes column in Table 38 and ranged from insufficient acreage, proximity to residential housing, land use restrictions, to incompatible co-uses.

Table 38. Locations Assessed for Large-Scale Composting

Known As	Street #	Dir.	Street Name	ResAdj	Acres	Local Knowledge Notes
Hasbrouck Park	375-405& R		Delaware Ave	c) many	45.30	The park is a known, active recreational use location. It is a large parcel with poor access given road width (i.e., width of a driveway); it is adjacent to a school. The lower section of the lot, however, is large and accessible. Determined to be suitable for food waste drop-off and compost distribution. There is a former tree nursery that would need to be cleared and could be used for community composting. Use of the school parking lot would be required to make it most accessible as a food waste drop-off site. Approximately 90% is either forested or an active recreational facility.
Hasbrouck Park	375-405& R		Delaware Ave	c) many		The park is a known, active recreational use location. It is a large parcel with poor access given road width (i.e., width of a driveway); it is adjacent to a school. The lower section of the lot, however, is large and accessible. Determined to be suitable for food waste drop-off and compost distribution. There is a former tree nursery that would need to be cleared and could be used for community composting. Use of the school parking lot would be required to make it most accessible as a food waste drop-off site. Approximately 90% is either forested or an active recreational facility.
Kingston Point Beach	66-106		Delaware Ave	a) none	10.57	A waterfront destination that is known for recreational activities and will remain a park in perpetuity. Both community composting and drop-off activities would need to take into account high water table and flooding that takes place at least six times a year to a depth of approximately one foot. Brick covering is prevalent. The City is currently overhauling the location, which is remote and accessible by MSW trucks. Easily accessible to residents and receives over 100 visitors per day. Animals may be a concern. Permanent storage sheds could hold finished compost for later distribution.
Kingston Point Park	41		Delaware Ave	a) none	0.00	Park known for recreational activities. See entry for Kingston Point Beach.
Kingston Point Park	53		Delaware Ave	a) none	84.70	Park known for recreational activities. See entry for Kingston Point Beach.
Kingston Point Park			Land at Kingston Point	a) none	2.10	Park known for recreational activities. See entry for Kingston Point Beach.

Transfer Station	1-31		Condie St	a) none	8.60	Parcel address commonly known as 69 Albert Street, although Condie Street address appears in the Ulster County Parcel Viewer and Final Assessment Roll. Parcel is used as City's Transfer Station and currently serves as all yard waste collection storage and management. DPW staff noted that the 3.5 acres previously considered for large-scale composting would be unfeasible due to steep drop-off on two sides. Site visit revealed that reducing the acreage to approximately 2.09 acres would address the drop-off issue, but would leave minimal room for equipment maneuvering give location configuration. Site determined to be adequate for food waste drop-off, neighborhood composting, compost distribution.
First Avenue Yard	514-520		First Ave	b) few	0.63	This parcel has a number of uses. It is located in a neighborhood with few houses, although concerns have been raised about the current uses. Large trucks already travel this road as the site is used for debris disposal. Acreage determined using Ulster County Parcel Viewer. While viable for small-scale uses, determined to not be viable for any composting activities due to small size and low residential density.
First Avenue Yard	522-528		First Ave	b) few	0.60	This parcel has a number of uses. It is located in a neighborhood with few houses, although concerns have been raised about the current uses. Large trucks already travel this road as the site is used for debris disposal. Acreage determined using Ulster County Parcel Viewer. While viable for small-scale uses, determined to not be viable for any composting activities due to small size and low residential density.
Wilbur Avenue Complex	376-378		Wilbur Ave	b) few	0.18	Parcel surrounded by 56.41-2-28. Determined to not be suitable for composting activities due to location of senior living facility across the street and DEC site use restrictions. Known public works yard. Location of former City refuse incinerator.
Wilbur Avenue Complex	380-392		Wilbur Ave	b) few	2.00	Parcel does not appear on Ulster County Parcel Viewer but was found on Final Assessment Roll. Determined to not be suitable for composting activities due to location of senior living facility across the street and DEC site use restrictions. Known public works yard. Location of former City refuse incinerator.
Wilbur Avenue Complex	426		Wilbur Ave	b) few	2.90	Final Assessment Roll states "Added 394-458"; adjacent to 56.41-2-28. City owned and fully operational with 15+ staff. Determined to not be suitable for composting activities due to location of senior living facility across the street and DEC site use restrictions. Known public works yard. Location of former City refuse incinerator.

Wilbur Avenue Complex			Wilbur Ave	b) few	2.27	Parcel does not appear on Final Assessment Roll but was found in the Ulster County Parcel Viewer, although without ownership information. The Assessment Roll lists it as City owned, but the Official Ulster Count Tax Map lists the owner as NYS Realty & Terminal Co. Area is currently used as City DPW yard. Acreage calculated with the Parcel Viewer measurement tool. Determined to not be suitable for composting activities due to location of senior living facility across the street and DEC site use restrictions. Known public works yard. Location of former City refuse incinerator.
	327-349		Wilbur Ave		1.20	Determined to not be suitable for composting activities due to stream and riparian area.
	240-256 R		Hurley Ave	c) many	14.40	Parcel determined to not be viable for any composting activities due to residential properties located to the east, the Thruway to the west, and its narrowness with steep slopes from a rock outcrop along the entire length.
	283	W	Oreilly St	b) few	0.85	Determined to not be suitable for composting activities due to nearby residences.
	58-64	S	Wall St		1.00	Determined to not be suitable for composting activities due to stream and riparian area.
	66-110	S	Wall St		3.60	Determined to not be suitable for composting activities due to stream and riparian area.
	112-126	S	Wall St		0.00	Determined to not be suitable for composting activities due to stream and riparian area.
	128	S	Wall St		0.06	Determined to not be suitable for composting activities due to stream and riparian area.
	130	S	Wall St		0.06	Determined to not be suitable for composting activities due to stream and riparian area.

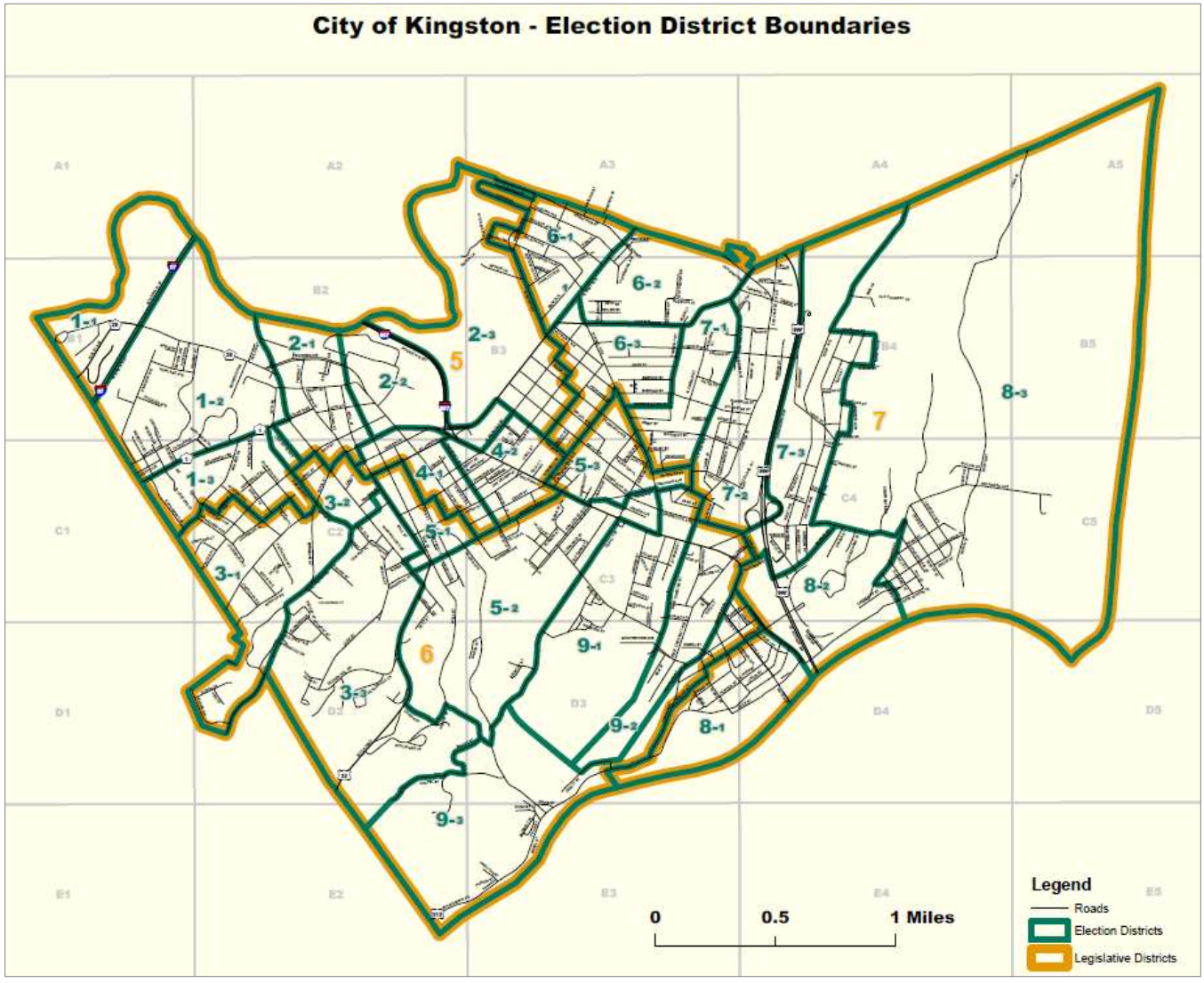
2. LOCATIONS VIABLE FOR COMPOSTING-RELATED ACTIVITIES, BY WARDS

The locations identified as being suitable for composting-related activities are found in 12 sub-wards, with the sub-ward distribution shown in Table 39. City of Kingston Ward Distribution of Viable Composting-Related Activities. As reference, Map 3. City of Kingston - Election District Boundaries is included for an understanding of the geographic distribution of wards / sub-wards. Wards are represented by the green numerals for Election Districts. For example, ward and sub-ward appear as 8-3. The viable locations are well distributed across the City's wards, with all but two wards represented. The demographics of locations viable for composting-related activities were also reviewed to ensure equitable distribution of the locations. The maps referenced are included in Appendix E. Demographics of Composting Locations.

Table 39. City of Kingston Ward Distribution of Locations Viable for Composting-Related Activities

Ward 1-2: two	Ward 4-2: three	Ward 6-1: one	Ward 8-1: one
Ward 3-3: one	Ward 5-1: one	Ward 7-2: one	Ward 8-2: two
Ward 4-1: one	Ward 5-2: two	Ward 7-3: one	Ward 8-3: two

Map 3. City of Kingston - Election District Boundaries



E. COMPOSTABLE PRODUCT OPTIONS

E.1. BACKGROUND

Research was conducted to understand the cost and availability of compostable products, including serving-ware, take-out containers, bins, bin liners and more. The purpose of this research is to provide the City of Kingston with purchasing options, due to the vast availability of compostables, as well as varying acceptability requirements implemented by local composting processing facilities. UCRRA,[283] for example, has fairly stringent guidelines for what may or may not be accepted at their composting facilities. UCRRA's standard for finished compost is a product that is US Composting Council STA Certified, which includes meeting the US EPA's testing limits for heavy metals and pathogens.[284] Greenway Environmental Services,[285] a commercial waste management company, and the New Paltz "Zero Waste Initiative",[286] two other local composting entities, have different guidelines and thus may accept products that UCRRA does not. The more stringent the facilities guidelines are, the fewer products will be accepted.

There exist many products on the organics market that are biodegradable, but not compostable, and consideration should be taken throughout the purchasing process to whether this is critical to the City of Kingston. Biodegradable but non-compostable products will not be accepted at certain composting programs, because, while they will eventually decompose, they will not degrade into fully organic matter. During decomposition, biodegradable products break down into many natural elements through the actions of living things such as microorganisms and fungi, while compostables break down exclusively into a humus, the organic component of soil.[287] Understanding the cost, availability, and compost-ability of items considered for purchase by the City is crucial in the determination of where and how those items will eventually be processed into safe, useable, and high-quality compost.

With regards to bins, liners, and totes for food waste collection in residential settings, through techniques such as injection-molding and 3D printing, companies can produce, in bulk, the products necessary to implement City-wide initiatives that may require thousands of totes, bins, and liners. The market for these products is ever-expanding. In addition to those products analyzed for the purposes of this Study, there are numerous alternatives. Demand for these products continues to rise as the technology allowing efficient and cost-effective manufacturing of such products progresses. The City of Kingston's implementation of an organics diversion plan should pay particular attention to the environmental impact of each product as well as the quality and composition of the materials. While the products in this Study represent only a small percentage of the those commercially available, they outline the vast availability and variety that can be found throughout the marketplace.

E.2. RECOMMENDATIONS ON COMPOSTABLE PRODUCT OPTIONS

- **The City should inform the Kingston population of the compostable products available.** The education and outreach effort of the City should include informing the Kingston population of

[283] UCRRA, https://ucrra.org/.

[284] "STA Requirements", US Composting Council.

[285] Greenway Environmental Services, https://www.greenwayny.com/.

[286] "Zero Waste Initiatives", Town of New Paltz.

[287] "Frequently Asked Questions about Plastic Recycling and Composting", US EPA, https://www.epa.gov/trash-free-waters/frequently-asked-questions-about-plastic-recycling-and-composting. Accessed November 30, 2021.

the available compostable products that are truly compostable and less or non-toxic. The market is inundated with product claiming to be compostable but do not meet the compostable requirements in actuality. The market is also filled with products claiming to be non-toxic. The City will do its residents a great service providing them with the information needed to make sound purchasing decisions. From this Study's research, the City can also create a guidance document or webpage connecting constituents with legitimate products.

E.3. THE BIODEGRADABLE PRODUCTS INSTITUTE: CERTIFICATION, LOGO, AND STANDARDS

The terms "biodegradable" and "compostable" are frequently used interchangeably without true consideration of how the materials decay. To rectify this, producers seek certification from the Biodegradable Products Institute[288] (BPI). The BPI is North America's leading certifier of compostable products and packaging. BPI certification allows consumers, composters, waste haulers, regulators, and officials to more easily distinguish products which are designed to biodegrade, and which among those are compostable.[289] When searching for compostable products in the marketplace, thousands of results may be presented to the buyer that might be labeled as biodegradable or compostable, but in reality are not. By crosschecking these products with the BPI list, the buyer can ensure that which they intend to purchase is indeed compostable. Since the labeling of these products is often inconsistent, use of the BPI list is a simple way to ensure that purchased products may be disposed of and processed in a way that minimizes environmental impacts and maintains a circular economy.[290]

The BPI has created a "Compostable Logo"[291] which certifies that a biodegradable product may be composted. This logo designates biodegradable products as compostable in industrial facilities, but does not necessarily extend to backyard composting, as a number of compostable products require processing beyond the capabilities of a home composter in order to fully degrade into organic matter. BPI provides a comprehensive listing[292] of all products that have received their certification, thus simplifying the purchase of these products and limiting the quantity of non-compostables that end up at composting facilities.

UCRRA, and many other facilities, only accept BPI certified products that meet the US American Society for Testing and Materials (ASTM) Standards D6400.[293] The decomposition of materials that meet the ASTM Standards D6400 "must occur at a rate similar to the other elements of the material being composted within 6 months and leave no toxic residue that would adversely impact the ability of the

[288] BPI, https://bpiworld.org/

[289] "Certification", BPI, https://www.bpiworld.org/Certification. Accessed November 30, 2021.

[290] "Education", BPI, https://bpiworld.org/Education. Accessed December 6, 2021.

[291] "The Compostable Logo", BPI, https://bpiworld.org/BPI-Public/Program.html/. Accessed November 30, 2021.

[292] "Find Certified Products", BPI, https://bpiworld.org/Find-Certified-Products. Accessed November 30, 2021.

[293] Standard Specification for Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities", ASTM, https://www.astm.org/d6400-19.html. Accessed November 30, 2021.

finished compost to support plant growth."[294] Items that meet these standards include those made with bioplastics; materials produced from renewable biomass sources, such as corn starch, tapioca root, straw, woodchips, sugarcane, etc. as raw materials, as opposed to common plastics that are derived from petroleum or natural gas, as well as natural materials such as bamboo.[295]

E.4. BIOPLASTICS AND OTHER COMPOSTABLES

The most common form of bioplastic used in the production of compostable materials is polylactic acid, or PLA. PLA is a commercially compostable bioplastic that can be produced from a number of renewable sources. In the United States, PLA is most commonly derived from corn starch. PLA products are biodegradable under industrial composting conditions and free of BPA,[296] a highly impactful contaminant associated with conventional plastic pollution.[297] PLA products partially decompose into water and carbon dioxide within 60 days. Outside of industrial composting conditions, PLA decomposition occurs at a rate akin to that of non-bioplastics, which require hundreds or even thousands of years to fully break down.[298] It is for this reason that it is critical for PLA products to end up in industrial composting facilities, otherwise risking a severely prolonged decomposition period.

Certain PLA products may be recycled, but they must be handed over to a facility that has the ability to process them and not disposed of in a bin with other non-bioplastics for curbside collection. Because PLA is a thermoplastic that melts at lower temperatures than non-thermoplastics, if mixed in with regular plastics for recycling, PLA products will contaminate the batch.[299]

There is a wide availability of compostable products for purchase beyond those made with PLA plastics; alternate options are available in materials such as uncoated cardboard, paper, or bamboo. Bamboo is a highly renewable natural material that is biodegradable, compostable, and sturdy that is used in many compostable products, especially utensils and other dining ware. Bamboo products that have not been chemically processed will fully degrade in 2-6 months, depending on the product and composting conditions. The bamboo plant has many impressive, positive ecological qualities that make products of this material a notable alternative to petroleum-based plastics.[300] Uncoated cardboard and paper materials are also highly biodegradable. There exist countless products, such as

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[294] "Frequently Asked Questions about Plastic Recycling and Composting", US EPA, https://www.epa.gov/trash-free-waters/frequently-asked-questions-about-plastic-recycling-and-composting. Accessed November 30, 2021.

[295] "Rethinking Plastic Packaging – How Can Innovation Help Solve the Plastic Waste Crisis?", US EPA, September 21, 2020, https://bioplasticsnews.com/2019/07/02/all-you-need-to-know-about-pla/.

[296] Renee Cho, "The Truth About Bioplastics", Columbia Climate School, State of the Planet, December 13, 2017, https://news.climate.columbia.edu/2017/12/13/the-truth-about-bioplastics/.

[297] Compostable food packing is typically made to be nonstick and waterproof, which requires the use of PFAS, which have raised significant health concerns (https://bioplasticsnews.com/2019/06/01/bioplastics-toxic-health-hazard/). Composting facilities such as UCRRA's do not accept these products in order to maintain their STA Certification from the US Composting Council.

[298] William Harris, "How Long Does It Take For Plastics to Degrade?" How Stuff Works, April 2021, https://science.howstuffworks.com/science-vs-myth/everyday-myths/how-long-does-it-take-for-plastics-to-biodegrade.htm.

[299] "All You Need to Know About PLA", BioPlastics News, 2019, https://bioplasticsnews.com/2019/07/02/all-you-need-to-know-about-pla/.

[300] Liu et al, "Biodegradable, Hygienic, and Compostable Tableware from Hybrid Sugarcane and Bamboo Fibers as Plastic Alternative", Matter, December 2020, https://www.sciencedirect.com/science/article/pii/S2590238520305580.

straws, plates, bowls, and napkins that are produced with coated cardboard or chemically treated paper that may very easily be replaced with sustainable, compostable options. In addition to bioplastics, the BPI catalogue provides certification for products made of bamboo, paper, and cardboard, and users can find these products by simply conducting a search of the catalogue using relevant keywords.

E.5. THE MARKET FOR COMPOSTABLE DISPOSABLES

An integral point in the implementation of a successful organics initiative is an understanding of available compostable products for both municipal and individual use, as well as the associated costs of purchase and disposal. When purchases are to be made, the City of Kingston is required to follow the proper procurement process as outlined in the City's Procurement Manual.[301] Proper procedures for municipal procurement over $1,000 call for purchasing to be made following verbal quotes from the manufacturer or retailer. If goods and services are being purchased for public works initiatives, expenditures exceeding a $35,000 threshold over the course of the fiscal year require a formal bid process.

To understand the market for compostable disposables in preparation for future purchase, a review of available items was conducted in December 2021 and prices were quoted from three online retailers. Available items included bags, bowls, clamshells, cold cups and lids, flatware, food trays, hot cups and lids, plates, and straws. The three online retailers included Amazon,[302] WebstaurantStore,[303] and EcoProducts Store.[304] Brands and retailers were selected for review based on their presence on the BPI list and commercial availability. For each product type, a search was conducted of the BPI list, the results were then identified on each of the three retailers. Those products that were found on the BPI list and on all three retailers were used in this study. Products branded by eight companies were analyzed: GreenEarth,[305] StalkMarket,[306] Stack Man,[307] Planet Plus,[308] Footprint,[309] Amazon Basics,[310] EcoQuality,[311] and BioBag[312]. While this review only scratches the surface on available products, it made clear certain trends in pricing and availability.

Because of lower availability and higher manufacturing costs, it is often assumed that eco-friendly products will be pricier than their more conventional counterparts.[313] However, the research

[301] Brian Woltman, "Procurement Policies and Procedures", City of Kingston, January 2020, https://www.kingston-ny.gov/filestorage/8463/8511/8654/14878/2020_Procurement_Policy_Manual.pdf.

[302] Amazon, http://amazon.com. Accessed March 14, 2023.

[303] Webstaurant Store, https://www.webstaurantstore.com/. Accessed March 14, 2023.

[304] EcoProducts Store, https://www.ecoproductsstore.com. Accessed March 14, 2023.

[305] GreenEarth, https://usgreen.earth/companyprofile/. Accessed March 14, 2023.

[306] StalkMarket, https://www.stalkmarketproducts.com/. Accessed March 14, 2023.

[307] Clean Water Mill. https://cleanwatermill.com/collections/vendors?q=Stack%20Man. Accessed March 14, 2023.

[308] Planet Plus, https://planetplusproducts.com/. Accessed March 14, 2023.

[309] Footprint, http://www.footprintus.com/. Accessed March 14, 2023.

[310] Amazon, http://amazon.com. Accessed March 14, 2023.

[311] EcoQuality, https://ecoqualityinc.com/. Accessed March 14, 2023.

[312] BioBag, https://www.biobagusa.com/. Accessed March 14, 2023.

[313] Renee Cho, "The Truth About BioPlastics".

conducted for this Study does not fully support this assumption. Compostable cold cups and lids, for example, were found to be less expensive through all three retailers, when compared to non-compostable plastic cups. Of the nine products researched and graphed in Figure 72. Product Cost Comparison: Compostable vs. Non-compostable, six were found to have a compostable option that was equal or less in cost to the non-compostable. Additionally, it was found that, consistent with non-compostables, the purchase of the compostable material in bulk greatly reduces their per-unit cost.

As manufacturers implement further efficient and sustainable methods for producing compostable materials, namely bioplastics, availability goes up and costs go down. Beyond those products researched and represented in Figure 72, there are countless alternatives commercially available. The search results for "cold cups", "clamshells" or "plates" on the BPI list provide users with thousands of product options from dozens of companies. It is apparent that the market for compostable products is continuing to expand and that availability is following suit.

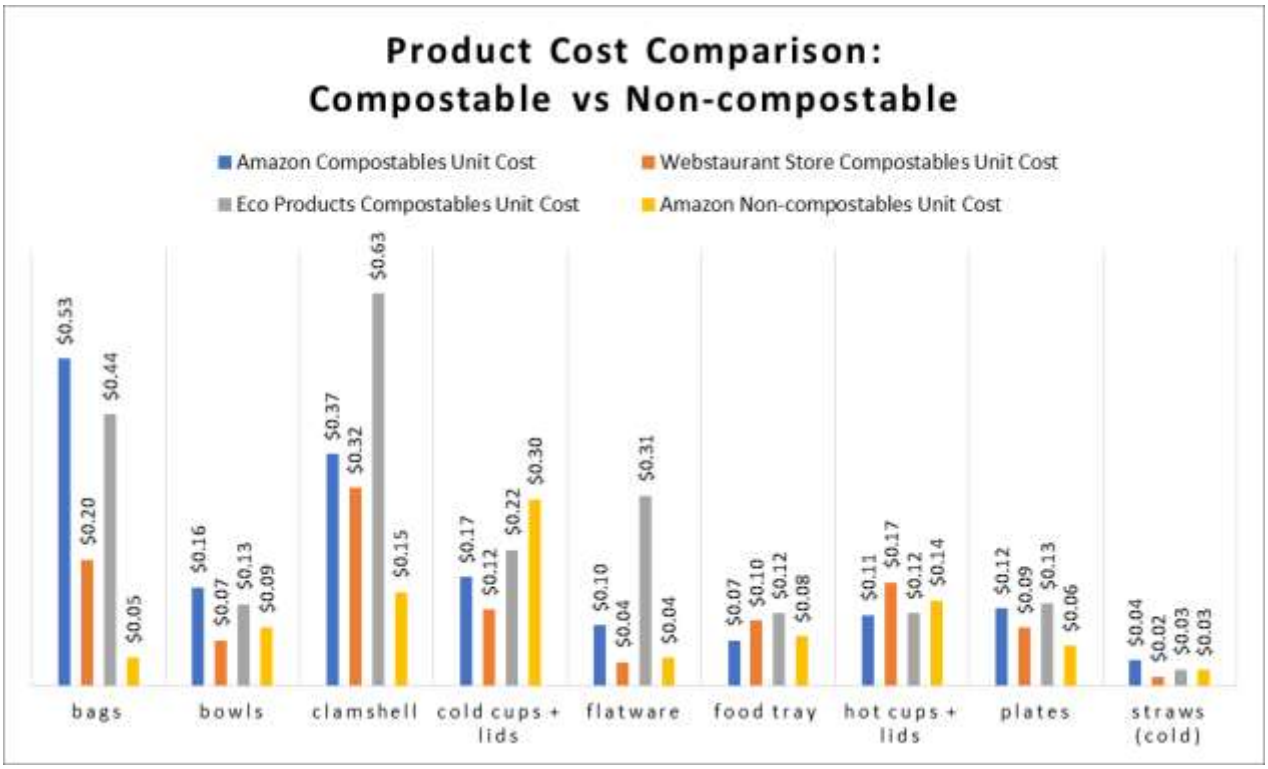

Figure 72. Product Cost Comparison: Compostable vs. Non-compostable (December 2021 Pricing)

E.6. BINS, LINERS, AND TOTES

A further review was conducted to understand the market for and availability of small bins for desks or kitchens, rolling totes for collection, liners, and backyard composters. Information was collected from 18 brands through a web-based search. Products fell under the following categories: kitchen collectors, kitchen collector liners, curbside totes, and curbside tote liners. The products offered by each brand are listed in Table 40. Brands and Products Researched below in alphabetical order, with more detailed listing following. Additional information on the 18 brands included in Table 40 is found Appendices, Appendix F. Bins, Liners, and Totes. Ultimately this review reveals that product offerings are readily available on the market for purchase at the sizes and quantities City residents may need for a Kingston food waste collection program.

Table 40. Brands and Products Researched

Brand	Kitchen Collectors	Kitchen Collector Liners	Curbside Totes	Curbside Tote Liners
AL-PACK		X		X
BioBag	X	X		X
BioStar				X
Busch Systems	X			
Cascade	X		X	
EcoProducts		X		X
EcoSafe	X	X	X	X
EnviroWorld	X		X	
Epica	X			
Glad		X		
Natur-Bag		X		X
NorPro		X		
Orbis	X		X	
Oxo	X			
Rehrig			X	
Schaefer			X	
Taurus	X			
Toter	X		X	

5. GREENHOUSE GAS EMISSIONS ANALYSIS

A. GHG EMISSIONS REDUCTION OVERVIEW

The City of Kingston has demonstrated a significant commitment to taking climate action, completing hundreds of actions outlined in their 2012 Climate Action Plan and reducing emissions by more than their goal of 20% by 2020. The City has undertaken a new Climate Action Plan for 2030 that was completed in December 2021.[314] The City's commitment to climate action extends to its plan to divert organics from the waste stream. Ensuring that organics are not landfilled has been shown to reduce GHG emissions and will contribute to the City meeting its 2030 climate action goals.

Using the City's waste data, averaged over the past six years, coupled with estimates based on data from communities that have implemented organics diversion programs similar to the program Kingston may implement, and the EPA's Policy and Program Impact Estimator: A Materials Recovery Greenhouse Gas (GHG) Calculator for Communities,[315] we estimate that if the City of Kingston implemented a curbside organics collection program, an additional 1,084.92 tons of waste annually

[314] "Kingston 2030 Climate Action Plan", Kingston, NY, November 2021. https://engagekingston.com/climate-action-plan.

[315] "Policy and Program Impact Estimator: A Materials Recovery Greenhouse Gas (GHG) Calculator for Communities", US EPA, May 13, 2016. https://www.epa.gov/warm/policy-and-program-impact-estimator-materials-recovery-greenhouse-gas-ghg-calculator.

could be diverted, translating to between a net 745.43-1,035.82 metric tons of carbon dioxide equivalent (MTCOe) avoided. Taking the high range and applying the US EPA's Greenhouse Gas Equivalencies Calculator[316] puts the impact from this reduction into perspective, as is shown in Table 1. Impact from Implementing the Kingston Organics Diversion Program below.

Table 1. Impact from Implementing the Kingston Organics Diversion Program

Reducing GHG emissions by 1,035.82 MTCOe from composting Kingston food waste is like…	
taking 223 gasoline-powered passenger vehicles off the road.	not driving 2,571,118 miles in a gasoline-powered passenger vehicle.
the carbon sequestered from 17,127 tree seedlings grown for 10 years.	the carbon sequestered from 1,226 acres of US forests for one year.
not using 2,398 barrels of crude oil.	not consuming 101,750 gallons of diesel.
avoiding emissions from 51.2 garbage trucks of waste recycled instead of landfilled.	not charging 125,999,886 smartphones.

As noted earlier, a range was provided on the net MTCO2e avoided. A range is provided for two reasons. First, the actual estimate of GHG emissions avoided depends on whether Kingston decides to count the Scope 3 emissions of transporting the food scraps to the landfill. These are indirect emissions for Kingston, but they are part of the lifecycle emissions of food scraps generated in the City. The second reason a range is provided is because two GHG emissions calculators were used and they resulted in different estimates. The range is useful to show that even using the lower amount results in a significant emissions reduction for the City.

B. RECOMMENDATIONS FROM GHG EMISSIONS ANALYSIS

The City should compost its food waste based on the annual estimated reduction in greenhouse gas emissions alone. The positive climate impact from diverting food waste from the City's waste stream is clearly shown in Table 1. Impact from Implementing the Kingston Organics Diversion Program. Whether one most easily visualizes the equivalent GHG emissions reduction in barrels of crude oil not used or passenger vehicles miles not driven, the positive environmental and health impact to the Kingston community is clear. The benefits also reach beyond the City given the reduction of food waste transport to Seneca Meadows and the avoided emissions along the way from the reduced need for transport.

C. METHODOLOGY

Kingston averaged a total of 9,900.72 tons of MSW collected by DPW annually from 2014-2019. This is comprised of an average of 7,760.97 tons of refuse disposed and 1,834.75 tons of recyclables collected (see 2.1. Refuse & Recycling Tonnages in this Study).

[316] "Greenhouse Gas Equivalencies Calculator", US EPA, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator. Accessed December 27, 2021.

An evaluation for the quantity of organic waste the City creates and what quantity of organics could be diverted from a potential curbside organics program is outlined in "Municipal Estimate" in this Study. Using the estimated residential and government food waste rate, Kingston is estimated to send 3,493.57 tons of food scraps collected by the City annually to the landfill (see Table 10. Estimated Food Waste of Kingston's MSW Stream, City-Collected Residences in this Study). Using the collection rate, Kingston can anticipate 1,084.92 tons of food waste collected from a curbside collection program (see Table 11. Estimated Food Waste Collected from Kingston MSW for a City-wide Curbside Collection Program).

C.1. DISCUSSION ABOUT ANALYSES

The analyses presented will show a disparity between the United States Environmental Protection Agency (US EPA) WARM 15 model and the Stop Waste calculator, which purports to use WARM methodology. The Stop Waste calculator is meant to be very simple and uses one calculation to measure the reduction in emissions: 0.8808 Tons CO2E saved per Ton of Material Recycled/Composted. However, the WARM application has a 60-page document detailing the methodology behind the calculations just for organics and does not have a simple calculation like the Stop Waste calculator.[317] It is possible the Stop Waste calculator is using an older version of the WARM tool or has vastly simplified it.

This emissions reduction analysis is an estimate that shows, despite the calculator used and the compost facility chosen, there is a real reduction in emissions from composting even a very conservative portion of the City of Kingston's food scraps. It shows that most emissions reductions come from composting vs. landfilling food scraps rather than transportation, although taking into account the indirect emissions of transporting food scraps to the landfill is considerable. This is in line with other reports reviewed.

This analysis does not take into account transportation emissions from curbside collection of food scraps, just moving the food scraps from the City of Kingston to the transfer station, landfill, or composting facility.

D. EPA WARM ANALYSIS

To find the metric tons carbon dioxide equivalent emissions of diverting those 1,084.92 tons of food scraps, the EPA's WARM 15 model was used. According to the EPA, "WARM is a tool that calculates and totals the GHG emissions, energy savings and economic impacts of baseline and alternative waste management practices, including source reduction, recycling, combustion, composting, anaerobic digestion and landfilling. The model calculates emissions, energy units and economic factors across a wide range of material types commonly found in municipal solid waste."[318]

[317] ICF For the U.S. Environmental Protection Agency Office of Resource Conservation and Recovery, "Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM) Organic Materials Chapters", US EPA, November 2020, https://www.epa.gov/sites/default/files/2020-12/documents/warm_organic_materials_v15_10-29-2020.pdf.

[318] "Basic Information about the Waste Reduction Model (WARM)", United States EPA, https://www.epa.gov/warm/basic-information-about-waste-reduction-model-warm. Accessed February 2, 2022.

The tool is downloaded as an application from the EPA's website and users can enter different scenarios into the model. The WARM15 Scenario uses the following assumptions:

- Kingston has data showing an annual average of 9,900.66 tons of total MSW. As noted above, Kingston is estimated to send 3,493.57 tons of food scraps to the landfill currently. This amount was entered under "Food scraps – Tons Landfilled" in the baseline. No other data was entered into the baseline.
- Assuming an expected annual average of 1,084.92 tons of food scraps diverted, that number was subtracted from the total number of estimated food scraps produced by the community annually (3,493.57-1,084.92=2,408.65) and two numbers were entered in the alternative scenario: 2,408.65 tons food scraps landfilled and 1,084.92 tons composted.
- Under the Further characteristics section, EPA assigns the appropriate regional "marginal" electricity grid mix emission factor. New York was chosen as the location.
- All other defaults were chosen except for mileage. The mileage defaults to 20 miles. This was zeroed out to calculate emissions from transportation separately.

Under the current system, the WARM 15 tool estimates that by landfilling 3,493.57 tons of food scraps annually, Kingston emits 1,744.37 tons of MTCO2e.

If the amount of food scraps landfilled is reduced to 2,344.23 tons annually from 1,084.92 tons of food scraps composted, the WARM 15 tool estimates a new total of 1,073.7 tons of MTCO2e, resulting in a reduction of 670.67 MTCo2e as shown in Table 41. WARM 15 Emissions Reduction Calculation.

Table 41. WARM 15 Emissions Reduction Calculation

Waste Reduction Model (WARM)
Summary Report (MTCO2E)

GHG Emissions Analysis - Summary Report

GHG Emissions Waste Management Analysis for **City of Kingston Estimated Annual Reduction in Emissions from Organics Collection**
Prepared by:
Project Period for this Analysis: to

	Baseline Scenario						Alternative Scenario						
Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total MTCO2E	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total MTCO2E	Change (Alt-Base) MTCO2E
Food Waste	N/A	3493.57	0.00	0.00	0.00	1744.37	0.00	N/A	2408.65	0.00	1084.92	0.00	1073.70	-670.67
						1744.37							1073.70	

E. STOP WASTE CALCULATOR ANALYSIS

Although the WARM tool is the most widely used and respected tool to measure waste emissions, in order to not fully rely on only one model, the Stop Waste Calculator was used as well.[319] The Stop Waste calculator was created by Stop Waste, a public agency responsible for reducing waste in Alameda County, California.[320]

[319] "Greenhouse Gas Reduction Calculator", Stop Waste, http://www.stopwaste.co/calculator/. Accessed February 7, 2022.

[320] Stop Waste, "GHG Reduction Calculator".

The Stop Waste calculator's "Method 2 – Using Monthly Total Tonnage for Food Scraps/Organics" measures the GHG/month avoided by recycling/composting rather than landfilling using EPA's WARM Model. The formula the Stop Waste Calculator uses is X tons of food scraps recycled x .8808 tons CO2e = Y metric tons avoided CO2e emissions.

Using that formula to measure Kingston's estimated reduction in emissions resulted in 955.5 MTCO2e in avoided emissions, as shown in Table 42. Stop Waste Calculator Emissions Reduction Estimate.

Table 42. Stop Waste Calculator Emissions Reduction Estimate

Stop Waste Calculator Assumptions	No VMT included	http://www.stopwaste.co/calculator/
Method 2 - Monthly total tonnage for food scraps/organics		
	1084.92	10.96% Estimated collection rate.
	0.8808	From Stop Waste Calculator. See: http://www.stopwaste.co/calculator/
	955.60	Annual MTCO2e emissions avoided

F. VEHICLE MILES TRAVELED CALCULATIONS

The next step was to calculate the vehicle miles traveled (VMT) emissions of the food scraps as the Stop Waste calculator does not include VMT in its assumptions and the VMT calculator for the WARM 15 model did not fit the needs of this project. The VMT was calculated using the Environmental Defense Fund Business' VMT calculator titled, "Green Freight Math: How to Calculate Emissions for a Truck Move."[321] The steps that are part of the Environmental Defense Fund Business VMT emission calculator are outlined in the Study Appendices, Appendix G. Greenhouse Gas Emissions Analysis. Table 43. Estimated VMT Emissions Under Different Scenarios provides a synopsis of the estimated emissions from VMT calculated under the scenarios of all food waste landfilled (VMT #1), landfilling of food waste not collected upon implementation of program (VMT #2), and estimated VMT emissions from transporting food waste to three possible composting facilities – Greenway, New Paltz, and UCRRA (VMT #3).

[321] Jason Mathers, "How to Calculate Emissions for a Truck Move", EDF Business, March 24, 2015. https://business.edf.org/insights/green-freight-math-how-to-calculate-emissions-for-a-truck-move/.

Table 43. Estimated VMT Emissions Under Different Scenarios

VMT #1: Baseline, All Food Scraps Landfilled			
INDIRECT - SENECA / UCRRA		**DIRECT - CITY HALL / UCRRA**	
3,493.57	Estimated tons food waste in Kingston's MSW stream, City-collected (35.29%).	3,493.57	Estimated tons food waste in Kingston's MSW stream, City-collected (35.29%).
457.00	Miles roundtrip to landfill from Kingston.	9.40	Miles roundtrip from Kingston to UCRRA.
25.00	Estimating 25 tons of food scraps per trip from UCRRA to Seneca Meadows. Based on high average of tons hauled per tractor trailer load from transfer station to landfill from MSWmanagement.com.	15.00	Estimating 15 tons of food scraps per trip from Kingston to UCRRA. Based on high average of tons hauled per garbage truck from NYC sanitation info.
258.32	**Indirect annual MTCO2e, all food scraps landfilled.**	**5.31**	**Direct annual MTCO2e, all food scraps landfilled.**

VMT #2: Composting Program Implemented, Non-Collected Food Scraps Landfilled			
INDIRECT - SENECA / UCRRA		**DIRECT - CITY HALL / UCRRA**	
2,408.65	Annual tons non-collected food scraps landfilled.	2,408.65	Annual tons non-collected food scraps landfilled.
457.00	Miles roundtrip to landfill from Kingston.	9.40	Miles roundtrip from Kingston to UCRRA.
25.00	Estimating 25 tons of food scraps per trip from UCRRA to Seneca Meadows. Based on high average of tons hauled per tractor trailer load from transfer station to landfill from MSWmanagement.com.	15.00	Estimating 15 tons of food scraps per trip from Kingston to UCRRA. Based on high average of tons hauled per garbage truck from NYC sanitation info.
178.10	**Indirect annual MTCO2e, non-collected food scraps landfilled.**	**3.66**	**Direct annual MTCO2e, non-collected food scraps landfilled.**

VMT #3: Compost Program Implemented, Emissions Comparison -- Greenway / New Paltz / UCRRA Composting Facilities			
DIRECT - CITY HALL / GREENWAY		**DIRECT - CITY HALL / NEW PALTZ**	
1,084.92	Annual tons food scraps composted (10.96% estimated collection rate).	1,084.92	Annual tons food scraps composted (10.96% estimated collection rate).
15.00	Estimating 15 tons of food scraps per trip from Kingston to Greenway. Based on high average of tons hauled per garbage truck load from NYC sanitation info.	15.00	Estimating 15 tons of food scraps per trip from Kingston to New Paltz. Based on high average of tons hauled per garbage truck load from NYC sanitation info.
40.53	Roundtrip miles to Greenway.	25.13	Roundtrip miles to New Paltz.
7.11	**Direct annual MTCO2e, food scraps transport to Greenway**	**4.41**	**Direct annual MTCO2e, food scraps transport to New Paltz**

DIRECT - CITY HALL / UCRRA	
1,084.92	Annual tons food scraps composted (10.96% estimated collection rate).
15.00	Estimating 15 tons of food scraps per trip from Kingston to UCRRA. Based on high average of tons hauled per garbage truck load from NYC sanitation info.
9.40	Roundtrip miles to UCRRA.
1.65	**Direct annual MTCO2e, food scraps transport to UCRRA**

G. TOTAL EMISSIONS REDUCTION ESTIMATES

The VMT emissions estimates were combined with the food waste emissions estimates calculated by WARM 15 and Stop Waste Calculator to arrive at total emissions estimates for four different scenarios: all food scraps landfilled and food scraps composted at the Greenway, New Paltz, or UCRRA facilities. The difference in estimates is shown in Tables 44 thru 47. Composting just 10.96% of the average annual food waste component of Kingston collected MSW results in a reduction in GHG emissions ranging from 745.43 MTCO2e (WARM 15 model) to 1,035.82 MTCO2e (Stop Wise model).

As shown in Table 44. Scenario A: All Food Scraps Landfilled, continuing to landfill all food scraps results in an estimated MTCO2e of 2,008.01 annually from landfilled food scraps using the WARM 15 model and direct and indirect VMT emissions using the Environmental Defense Fund VMT Emissions Calculator.

Table 44. Scenario A: All Food Scraps Landfilled

Scenario A: All Food Scraps Landfilled	
Tons food scraps landfilled	3,493.57
Waste Emissions Estimates	
Landfilled food scraps, MTCO2e produced (WARM 15)	1,744.37
Environmental Defense Fund VMT Emissions Calculator	
Direct VMT MTCO2e, UCRRA	5.31
Indirect VMT MTCO2e, Seneca	258.32
Total Estimated MTCO2e Annually	
All food scraps landfilled	**2,008.01**

As shown in Table 45. Scenario B: Food Scraps Composted at Greenway, composting 10.96% of the average annual food waste component of Kingston collected MSW at the Greenway composting facility results in an estimated annual MTCO2e ranging from 977.65 to 1,262.58 from direct and indirect VMT emissions as well as waste emissions. The range shown depends on the waste emissions model used, Stop Waste or WARM 15, respectively. In the "Waste Emissions Estimates" section, the WARM 15 model calculates MTCO2e reduction of 670.67 and 955.60 using the Stop Waste model.

Table 45. Scenario B: Food Scraps Composted at Greenway

Scenario B: Food Scraps Composted at Greenway	
Tons food scraps landfilled	2,408.65
Tons food scraps composted	1,084.92
Waste Emissions Estimates	
Landfilled food scraps, MTCO2e produced (WARM 15)	1,744.37
Food scraps (composted), MTCO2e reduced (WARM 15)	670.67
Food scraps (composted), MTCO2e avoided (Stop Waste)	955.60
Environmental Defense Fund VMT Emissions Calculator	
Direct VMT MTCO2e landfilled food scraps, UCRRA	3.66
Indirect VMT MTCO2e landfilled food scraps, Seneca	178.10
Direct VMT MTCO2e composted food scraps, Greenway	7.11
Total Estimated MTCO2e Annually	
Warm 15 Model	**1,262.58**
Stop Waste Model	**977.65**

As shown in Table 46. Scenario C: Food Scraps Composted at New Paltz, composting food waste at the New Paltz composting facility results in an estimated annual MTCO2e ranging from 974.95 to 1,259.88 (Stop Waste or WARM 15, respectively) from direct and indirect VMT emissions as well as waste

emissions. The small reduction from the Scenario C is due to the New Paltz facility's closer location than Greenway's.

Table 46. Scenario C: Food Scraps Composted at New Paltz

Scenario C: Food Scraps Composted at New Paltz	
Tons food scraps landfilled	2,408.65
Tons food scraps composted	1,084.92
Waste Emissions Estimates	
Landfilled food scraps, MTCO2e produced (WARM 15)	1,744.37
Food scraps (composted), MTCO2e reduced (WARM 15)	670.67
Food scraps (composted), MTCO2e avoided (Stop Waste)	955.60
Environmental Defense Fund VMT Emissions Calculator	
Direct VMT MTCO2e landfilled food scraps, UCRRA	3.66
Indirect VMT MTCO2e landfilled food scraps, Seneca	178.10
Direct VMT MTCO2e composted food scraps, New Paltz	4.41
Total Estimated MTCO2e Annually	
Warm 15 Model	**1,259.88**
Stop Waste Model	**974.95**

As shown in Table 47. Scenario D: Food Scraps Composted at UCRRA, composting food waste at UCRRA composting facility results in the lowest estimated annual MTCO2e ranging from 972.19 to 1,257.12 (Stop Waste or WARM 15, respectively) from direct and indirect VMT emissions as well as waste emissions. The additional reduction is due to UCRRA being the closest composting facility of the three within Ulster County.

Table 47. Scenarios D: Food Scraps Composted at UCRRA

Scenario D: Food Scraps Composted at UCRRA	
Tons food scraps landfilled	2,408.65
Tons food scraps composted	1,084.92
Waste Emissions Estimates	
Landfilled food scraps, MTCO2e produced (WARM 15)	1,744.37
Food scraps (composted), MTCO2e reduced (WARM 15)	670.67
Food scraps (composted), MTCO2e avoided (Stop Waste)	955.60
Environmental Defense Fund VMT Emissions Calculator	
Direct VMT MTCO2e landfilled food scraps, UCRRA	3.66
Indirect VMT MTCO2e landfilled food scraps, Seneca	178.10
Direct VMT MTCO2e composted food scraps, UCRRA	1.65
Total Estimated MTCO2e Annually	
Warm 15 Model	**1,257.12**
Stop Waste Model	**972.19**

6. COST BENEFIT ANALYSIS

The cost benefit analysis below outlines the opportunity cost to the City from landfilling food waste for the six-year period of MSW analyzed. Over the course of the analysis period, the City spent $4,796,276.89 in tipping fees for refuse at $103/ton (equivalent to $5,122,237.45 at $110/ton). On an averaged annualized basis, the City spent $799,379.48 at the $103 tipping fee (equivalent to $853,706.24 at the $110 tipping fee).

In contrast, were the City to have had a composting program in place, it could have saved, at minimum, $111,746.68 annually at $103/ton (equivalent to $119,341.11 calculated at $110/ton); the minimum cost savings are based on the conservative food waste collection rate of 10.96%. For the six-year period, the cost savings are estimated to be a minimum of $670,480.06 at $103/ton (equivalent to $716,046.66 at $110/ton). Although it is anticipated that the City would achieve a higher food waste collection rate, and therefore greater cost savings, the conservative collection rate is presented as a baseline for diversion program development purposes.

Achieving what would be the anticipated highest diversion rate of 35.92% would result in $2,159,023.96 in cost savings over the six-year period analyzed at $103/ton (equivalent to $2,305,753.75 at $110/ton). On an averaged annual basis, cost savings could be $359,837.33 at $103/ton (equivalent to $384,292.29 at $110/ton).

A. RECOMMENDATION FROM COST BENEFIT ANALYSIS

- **The City should compost its food waste based on the anticipated cost savings from tipping fees alone.** This Study presented a very conservative cost benefit analysis as a baseline for diversion program development purposes. At minimum, based on a conservative estimate of food waste diversion, the City can expect to save $119,341.11 annually. These funds can be used to start a pilot program, with additional savings garnered as the program expands and the City exceeds the conservative participation rates calculated by this Study. The aggressiveness of the City's approach to its food waste collection program – the level of education and outreach, staff engagement, and pilot expansion – will be determinant of the City's true cost savings from its program. Given Kingston's success in other energy and environmental related projects, this Study anticipates strong program participation from the Kingston population at program onset.

B. ANALYSIS

The "Food Waste Estimates" section of this Study provided the MSW tonnages for the City for 2014 – 2019. Appearing in that section, and provided below for easier reference, are Table 48. Kingston Estimated MSW Tonnages Calculated for 2014-2019 and Table 49. Kingston Refuse Tonnages Reported 2014-2019. Table 48 provides tonnages for refuse, recycling, and yard waste: the six-year tonnage total is 59,403.96 and the annual average is 9,900.66. Table 49 provides tonnages for refuse only: the six-year tonnage total is 46,565.80 and the annual average is 7,760.97.

Table 48. Kingston Estimated MSW Tonnages Calculated for 2014-2019

MUNICIPAL SOLID WASTE DISPOSED													
Tonnages													
	Month												
Year	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
2014	783.60	621.23	690.97	795.62	834.18	781.64	935.01	732.18	853.55	820.48	709.70	852.01	**9,410.17**
2015	720.86	648.46	776.77	952.61	791.15	957.12	927.96	805.84	893.34	865.45	797.27	924.78	**10,061.61**
2016	719.33	704.13	750.11	734.14	808.79	934.37	789.30	863.52	819.99	796.43	874.22	800.86	**9,595.19**
2017	784.34	664.33	722.39	787.33	915.75	904.36	834.08	882.73	799.96	862.50	861.69	717.35	**9,736.81**
2018	783.89	688.82	712.01	784.00	903.39	791.53	957.80	968.53	889.25	1,053.90	919.56	830.58	**10,283.26**
2019	861.66	736.81	778.65	898.64	962.82	826.47	988.86	881.91	848.20	914.39	774.58	843.93	**10,316.92**
TOTAL	**4,653.68**	**4,063.78**	**4,430.89**	**4,952.34**	**5,216.08**	**5,195.49**	**5,433.02**	**5,134.71**	**5,104.30**	**5,313.15**	**4,937.02**	**4,969.51**	**59,403.96**
												Annual Average	9,900.66

Table 49. Kingston Refuse Tonnages Reported 2014-2019

REFUSE DISPOSED													
Tonnages													
	Month												
Year	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
2014	599.42	512.94	559.68	681.36	695.96	644.99	746.98	589.42	723.45	687.11	567.18	676.62	**7,685.11**
2015	567.44	545.74	634.14	820.48	638.32	732.62	735.00	664.34	738.57	668.19	631.74	702.70	**8,079.28**
2016	564.31	565.65	636.51	585.07	638.36	730.44	625.37	713.35	660.94	626.57	676.12	607.90	**7,630.59**
2017	622.17	520.74	596.79	620.27	715.92	710.21	671.57	729.33	647.93	678.01	674.68	557.79	**7,745.41**
2018	631.83	541.33	581.86	635.08	744.40	646.04	715.65	726.90	650.03	756.71	658.71	610.87	**7,899.41**
2019	632.11	535.04	570.91	650.92	705.53	604.68	714.77	650.15	621.01	675.02	563.37	602.49	**7,526.00**
TOTAL	**3,617.28**	**3,221.44**	**3,579.89**	**3,993.18**	**4,138.49**	**4,068.98**	**4,209.34**	**4,073.49**	**4,041.93**	**4,091.61**	**3,771.80**	**3,758.37**	**46,565.80**
												Annual Average	7,760.97
Month's Average	602.88	536.91	596.65	665.53	689.75	678.16	**701.56**	678.92	673.66	681.94	628.63	626.40	

The disposal costs associated with disposal of refuse component only are shown in Table 50. Kingston Refuse Disposal Costs for Tonnages Reported 2014-2019, $103 Tipping Fee. The $103 tipping fee charged by UCRRA is in place for period of analysis. For comparison purposes, Table 51. Kingston Refuse Disposal Costs for Tonnages Reported 2014-2019, $110 Tipping Fee is provided to give a sense of the disposal costs to the City at today's tipping fee, $110. In both tables, monthly average costs over the period analyzed are provided as well as annual costs and the average annual disposal costs: $799,379.48 at the $103 tipping fee and $853,706.24 at the $110 tipping fee – a $54,326.76 or 6.8% increase. The six-year spend on tipping fees is $4,796,276.89 (at $103/ton) and $5,122,237.45 (at $110/ton).

Table 50. Kingston Refuse Disposal Costs for Tonnages Reported 2014-2019, $103 Tipping Fee

Disposal Costs at $103/Ton Rate													
UCRRA Solid Waste Disposal Fees:	$ 103.00	effective 2014-2019											
	Month												
Year	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
2014	$ 61,740.26	$ 52,832.82	$ 57,647.04	$ 70,180.08	$ 71,683.88	$ 66,433.97	$ 76,938.94	$ 60,710.26	$ 74,515.35	$ 70,772.33	$ 58,419.54	$ 69,691.86	**$ 791,566.33**
2015	$ 58,446.32	$ 56,211.22	$ 65,316.42	$ 84,509.44	$ 65,746.96	$ 75,459.86	$ 75,705.00	$ 68,427.02	$ 76,072.71	$ 68,823.57	$ 65,069.22	$ 72,378.10	**$ 832,165.84**
2016	$ 58,123.93	$ 58,261.95	$ 65,560.02	$ 60,262.21	$ 65,751.08	$ 75,235.32	$ 64,413.11	$ 73,475.05	$ 68,076.82	$ 64,536.71	$ 69,640.36	$ 62,613.70	**$ 785,950.26**
2017	$ 64,083.51	$ 53,636.22	$ 61,469.37	$ 63,887.81	$ 73,739.76	$ 73,151.63	$ 69,171.71	$ 75,120.99	$ 66,736.79	$ 69,835.03	$ 69,492.04	$ 57,452.37	**$ 797,777.23**
2018	$ 65,078.49	$ 55,756.99	$ 59,931.58	$ 65,413.24	$ 76,673.20	$ 66,542.12	$ 73,711.95	$ 74,870.70	$ 66,953.09	$ 77,941.13	$ 67,847.13	$ 62,919.61	**$ 813,639.23**
2019	$ 65,107.33	$ 55,109.12	$ 58,803.73	$ 67,044.76	$ 72,669.59	$ 62,282.04	$ 73,621.31	$ 66,965.45	$ 63,964.03	$ 69,527.06	$ 58,027.11	$ 62,056.47	**$ 775,178.00**
TOTAL	**$ 372,579.84**	**$ 331,808.32**	**$ 368,728.16**	**$ 411,297.54**	**$ 426,264.47**	**$ 419,104.94**	**$ 433,562.02**	**$ 419,569.47**	**$ 416,318.79**	**$ 421,435.83**	**$ 388,495.40**	**$ 387,112.11**	**$ 4,796,276.89**
												Average annual disposal cost:	$ 799,379.48
Month's Average	$ 62,096.64	$ 55,301.39	$ 61,454.69	$ 68,549.59	$ 71,044.08	$ 69,850.82	$ 72,260.34	$ 69,928.25	$ 69,386.47	$ 70,381.75	$ 66,093.66	$ 65,011.13	

Table 51. Kingston Refuse Disposal Costs for Tonnages Reported 2014-2019, $110 Tipping Fee

Disposal Costs at $110/Ton Rate

UCRRA Solid Waste Disposal Fees: $ 110.00 effective 2023

	Month												
Year	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
2014	$ 65,936.20	$ 56,423.40	$ 61,564.80	$ 74,949.60	$ 76,555.60	$ 70,948.90	$ 82,167.80	$ 64,836.20	$ 79,579.50	$ 75,582.10	$ 62,389.80	$ 74,428.20	**$ 845,362.10**
2015	$ 62,418.40	$ 60,031.40	$ 69,755.40	$ 90,252.80	$ 70,215.20	$ 80,588.20	$ 80,850.00	$ 73,077.40	$ 81,242.70	$ 73,500.90	$ 69,491.40	$ 77,297.00	**$ 888,720.80**
2016	$ 62,074.10	$ 62,221.50	$ 70,015.55	$ 64,357.70	$ 70,219.60	$ 80,348.40	$ 68,790.70	$ 78,468.50	$ 72,703.40	$ 68,922.70	$ 74,373.20	$ 66,869.00	**$ 839,364.35**
2017	$ 68,438.70	$ 57,281.40	$ 65,646.90	$ 68,229.70	$ 78,751.20	$ 78,123.10	$ 73,872.70	$ 80,226.30	$ 71,272.30	$ 74,581.10	$ 74,214.80	$ 61,356.90	**$ 851,995.10**
2018	$ 69,501.30	$ 59,546.30	$ 64,004.60	$ 69,858.80	$ 81,884.00	$ 71,064.40	$ 78,721.50	$ 79,959.00	$ 71,503.30	$ 83,238.10	$ 72,458.10	$ 67,195.70	**$ 868,935.10**
2019	$ 69,532.10	$ 58,854.40	$ 62,800.10	$ 71,601.20	$ 77,608.30	$ 66,514.80	$ 78,624.70	$ 71,516.50	$ 68,311.10	$ 74,252.20	$ 61,970.70	$ 66,273.90	**$ 827,860.00**
TOTAL	**$ 397,900.80**	**$ 354,358.40**	**$ 393,787.35**	**$ 439,249.80**	**$ 455,233.90**	**$ 447,587.80**	**$ 463,027.40**	**$ 448,083.90**	**$ 444,612.30**	**$ 450,077.10**	**$ 414,898.00**	**$ 413,420.70**	**$ 5,122,237.45**
											Average annual disposal cost:		$ 853,706.24
Month's Average	$ 66,316.80	$ 59,059.73	$ 65,631.23	$ 73,208.30	$ 75,872.32	$ 74,597.97	$ 77,171.23	$ 74,680.65	$ 74,102.05	$ 75,164.98	$ 70,585.46	$ 69,429.36	

Table 52. Estimated Food Waste of Kingston's MSW Stream, City-Collected Residences is provided below for reference from the "Food Waste Estimates" section. It provides the combined food waste produced by residences, commercial businesses, and government, for residences collected by the City's DPW, estimated at 3,493.57 tons. In a scenario where the City were diverting 35.92% of its MSW stream, the opportunity cost of food waste disposal is shown in Table 53. Kingston Costs Savings from Food Waste Diversion for Tonnages Reported 2014-2019, $103 Tipping Fee and Table 54. Kingston Costs Savings from Food Waste Diversion for Tonnages Reported 2014-2019, $110 Tipping Fee. For the six-year period analyzed, the opportunity cost of disposing food waste in the landfill is $2,159,023.96 at $103/ton and $2,305,753.75 at $110/ton. The annual average cost savings calculated at $103/ton is $359,837.33; calculated at $110/ton, it is $384,292.29.

Table 52. Estimated Food Waste of Kingston's MSW Stream, City-Collected Residences

35.29% Combined Diversion Rate 24.38% Residential Diversion Rate, Population Receiving City-Collection 9.68% Commercial Diversion Rate
1.23% Municipal Diversion Rate

Tonnages

	Month												Annual
Year	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
2014	276.50	219.21	243.82	280.74	294.35	275.81	329.93	258.36	301.19	289.52	250.43	300.64	**3,320.49**
2015	254.36	228.82	274.09	336.14	279.17	337.73	327.44	284.35	315.23	305.38	281.33	326.32	**3,550.36**
2016	253.82	248.46	264.68	259.05	285.39	329.70	278.51	304.70	289.34	281.03	308.48	282.59	**3,385.78**
2017	276.76	234.42	254.90	277.82	323.13	319.11	294.32	311.48	282.28	304.34	304.06	253.13	**3,435.75**
2018	276.60	243.06	251.24	276.64	318.77	279.30	337.97	341.76	313.78	371.88	324.48	293.08	**3,628.57**
2019	304.05	259.99	274.75	317.10	339.74	291.63	348.93	311.19	299.30	322.65	273.32	297.79	**3,640.45**
TOTAL	**1,642.11**	**1,433.95**	**1,563.49**	**1,747.49**	**1,840.56**	**1,833.29**	**1,917.10**	**1,811.84**	**1,801.11**	**1,874.81**	**1,742.09**	**1,753.55**	**20,961.40**
									Month Average	291.13		**Annual Average**	3,493.57
												Annual Maximum	3,640.45

Table 53. Kingston Costs Savings from Food Waste Diversion for Tonnages Reported 2014-2019, $103 Tipping Fee

Cost Savings at $103/Ton from Organics Diversion at Full Diversion Rate for Population Receiving City Collection

UCRRA Solid Waste Disposal Fees: $ 103.00 effective 2014-2019

	Month												
Year	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**TOTAL**
2014	$ 28,479.77	$ 22,578.47	$ 25,113.15	$ 28,916.64	$ 30,318.09	$ 28,408.54	$ 33,982.74	$ 26,610.92	$ 31,022.09	$ 29,820.17	$ 25,793.89	$ 30,966.12	**$ 342,010.59**
2015	$ 26,199.50	$ 23,568.14	$ 28,231.54	$ 34,622.40	$ 28,754.18	$ 34,786.32	$ 33,726.51	$ 29,288.08	$ 32,468.25	$ 31,454.59	$ 28,976.61	$ 33,610.93	**$ 365,687.04**
2016	$ 26,143.89	$ 25,591.45	$ 27,262.40	$ 26,682.16	$ 29,395.30	$ 33,959.48	$ 28,686.94	$ 31,384.45	$ 29,802.36	$ 28,946.08	$ 31,773.34	$ 29,107.08	**$ 348,734.92**
2017	$ 28,506.67	$ 24,144.93	$ 26,255.11	$ 28,615.34	$ 33,282.74	$ 32,868.77	$ 30,314.46	$ 32,082.63	$ 29,074.37	$ 31,347.38	$ 31,317.94	$ 26,071.93	**$ 353,882.25**
2018	$ 28,490.31	$ 25,035.01	$ 25,877.85	$ 28,494.31	$ 32,833.51	$ 28,767.99	$ 34,811.21	$ 35,200.86	$ 32,319.77	$ 38,303.66	$ 33,421.37	$ 30,187.18	**$ 373,743.03**
2019	$ 31,316.70	$ 26,779.31	$ 28,299.71	$ 32,660.97	$ 34,993.51	$ 30,037.73	$ 35,939.91	$ 32,052.89	$ 30,827.69	$ 33,233.32	$ 28,151.90	$ 30,672.49	**$ 374,966.13**
TOTAL	**$ 169,136.85**	**$ 147,697.31**	**$ 161,039.76**	**$ 179,991.81**	**$ 189,577.32**	**$ 188,828.81**	**$ 197,461.76**	**$ 186,619.82**	**$ 185,514.53**	**$ 193,105.20**	**$ 179,435.04**	**$ 180,615.73**	**$ 2,159,023.96**
											Average annual cost-savings:		$ 359,837.33

Table 54. Kingston Costs Savings from Food Waste Diversion for Tonnages Reported 2014-2019, $110 Tipping Fee

Cost Savings at $110/Ton from Organics Diversion at Full Diversion Rate for Population Receiving City Collection													
UCRRA Solid Waste Disposal Fees:	$ 110.00	effective 2023											
	Month												
Year	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2014	$ 30,415.29	$ 24,112.93	$ 26,819.87	$ 30,881.84	$ 32,378.54	$ 30,339.21	$ 36,292.24	$ 28,419.43	$ 33,130.39	$ 31,846.78	$ 27,546.88	$ 33,070.61	**$ 365,254.03**
2015	$ 27,980.05	$ 25,169.86	$ 30,150.19	$ 36,975.38	$ 30,708.34	$ 37,150.44	$ 36,018.60	$ 31,278.53	$ 34,674.83	$ 33,592.28	$ 30,945.89	$ 35,895.17	**$ 390,539.55**
2016	$ 27,920.66	$ 27,330.68	$ 29,115.19	$ 28,495.51	$ 31,393.04	$ 36,267.40	$ 30,636.54	$ 33,517.37	$ 31,827.76	$ 30,913.28	$ 33,932.69	$ 31,085.23	**$ 372,435.35**
2017	$ 30,444.01	$ 25,785.85	$ 28,039.44	$ 30,560.07	$ 35,544.67	$ 35,102.57	$ 32,374.66	$ 34,263.00	$ 31,050.30	$ 33,477.78	$ 33,446.34	$ 27,843.81	**$ 377,932.50**
2018	$ 30,426.55	$ 26,736.42	$ 27,636.54	$ 30,430.82	$ 35,064.92	$ 30,723.09	$ 37,177.02	$ 37,593.15	$ 34,516.26	$ 40,906.82	$ 35,692.73	$ 32,238.73	**$ 399,143.05**
2019	$ 33,445.02	$ 28,599.26	$ 30,222.99	$ 34,880.64	$ 37,371.71	$ 32,079.12	$ 38,382.43	$ 34,231.24	$ 32,922.78	$ 35,491.90	$ 30,065.13	$ 32,757.03	**$ 400,449.27**
TOTAL	**$ 180,631.59**	**$ 157,734.99**	**$ 171,984.21**	**$ 192,224.27**	**$ 202,461.22**	**$ 201,661.84**	**$ 210,881.49**	**$ 199,302.73**	**$ 198,122.32**	**$ 206,228.85**	**$ 191,629.66**	**$ 192,890.59**	**$ 2,305,753.75**
											Average annual cost-savings:		$ 384,292.29

Table 55. Estimated Food Waste Collected from Kingston MSW for a City-wide Curbside Collection Program is again provided below for reference. It shows the estimated and conservative average annual tonnages of food waste diverted using a combined, conservative collection rate of 10.96%, estimated at 1,084.92 tons. The cost savings associated with a 10.96% diversion rate of its MSW stream, the opportunity cost of food waste disposal is shown in Table 56. Kingston Costs Savings from Collected Food Waste for Tonnages Reported 2014-2019, $103 Tipping Fee and Table 57. Kingston Costs Savings from Collected Food Waste for Tonnages Reported 2014-2019, $110 Tipping Fee. For the six-year period analyzed, the opportunity cost of disposing food waste in the landfill is estimated at $670,480.06 at $103/ton and $716,046.66 at $110/ton. The annual average cost savings calculated at $103/ton is $111,746.68; calculated at $110/ton, it is $119,341.11.

Table 55. Estimated Food Waste Collected from Kingston MSW for a City-wide Curbside Collection Program

10.96% Estimate Collection Rate	24.38% Residential Diversion Rate	42.60% Residential Participation Rate	54.00% Residential Set-out Rate
	1.23% Municipal Diversion Rate	9.68% Commercial Diversion Rate	

Tonnages

	Month												Annual
Year	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2014	85.87	68.07	75.72	87.18	91.41	85.65	102.46	80.23	93.53	89.91	77.77	93.36	**1,031.17**
2015	78.99	71.06	85.12	104.39	86.69	104.88	101.69	88.30	97.89	94.84	87.37	101.34	**1,102.56**
2016	78.82	77.16	82.20	80.45	88.63	102.39	86.49	94.62	89.85	87.27	95.80	87.76	**1,051.45**
2017	85.95	72.80	79.16	86.28	100.35	99.10	91.40	96.73	87.66	94.51	94.42	78.61	**1,066.96**
2018	85.90	75.48	78.02	85.91	98.99	86.74	104.96	106.13	97.44	115.49	100.77	91.02	**1,126.85**
2019	94.42	80.74	85.32	98.47	105.51	90.56	108.36	96.64	92.95	100.20	84.88	92.48	**1,130.53**
TOTAL	**509.95**	**445.31**	**485.54**	**542.68**	**571.58**	**569.32**	**595.35**	**562.66**	**559.33**	**582.22**	**541.00**	**544.56**	**6,509.52**
									Month Average	90.41		**Annual Average**	1,084.92

Table 56. Kingston Costs Savings from Collected Food Waste for Tonnages Reported 2014-2019, $103 Tipping Fee

Cost Savings at $103/Ton from Organics Diversion at Estimated Collection Rate for Population Receiving City Collection													
UCRRA Solid Waste Disposal Fees:	$ 103.00	effective 2014-2019											
	Month												
Year	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2014	$ 8,844.33	$ 7,011.69	$ 7,798.83	$ 8,980.00	$ 9,415.22	$ 8,822.21	$ 10,553.26	$ 8,263.96	$ 9,633.84	$ 9,260.59	$ 8,010.24	$ 9,616.46	**$ 106,210.62**
2015	$ 8,136.20	$ 7,319.03	$ 8,767.24	$ 10,751.91	$ 8,929.54	$ 10,802.81	$ 10,473.69	$ 9,095.35	$ 10,082.94	$ 9,768.15	$ 8,998.62	$ 10,437.80	**$ 113,563.29**
2016	$ 8,118.93	$ 7,947.37	$ 8,466.28	$ 8,286.08	$ 9,128.64	$ 10,546.04	$ 8,908.66	$ 9,746.37	$ 9,255.06	$ 8,989.14	$ 9,867.14	$ 9,039.14	**$ 108,298.85**
2017	$ 8,852.68	$ 7,498.15	$ 8,153.47	$ 8,886.43	$ 10,335.88	$ 10,207.32	$ 9,414.09	$ 9,963.19	$ 9,028.98	$ 9,734.86	$ 9,725.71	$ 8,096.58	**$ 109,897.34**
2018	$ 8,847.60	$ 7,774.57	$ 8,036.31	$ 8,848.84	$ 10,196.37	$ 8,933.83	$ 10,810.54	$ 10,931.55	$ 10,036.83	$ 11,895.12	$ 10,378.93	$ 9,374.56	**$ 116,065.06**
2019	$ 9,725.33	$ 8,316.25	$ 8,788.41	$ 10,142.79	$ 10,867.16	$ 9,328.15	$ 11,161.06	$ 9,953.95	$ 9,573.47	$ 10,320.53	$ 8,742.51	$ 9,525.27	**$ 116,444.89**
TOTAL	**$ 52,525.07**	**$ 45,867.07**	**$ 50,010.54**	**$ 55,896.05**	**$ 58,872.81**	**$ 58,640.36**	**$ 61,321.31**	**$ 57,954.37**	**$ 57,611.12**	**$ 59,968.39**	**$ 55,723.15**	**$ 56,089.81**	**$ 670,480.06**
											Average annual cost-savings:		$ 111,746.68

Table 57. Kingston Costs Savings from Collected Food Waste for Tonnages Reported 2014-2019, $110 Tipping Fee

Cost Savings at $110/Ton from Organics Diversion at Estimated Collection Rate for Population Receiving City Collection													
UCRRA Solid Waste Disposal Fees:	$ 110.00	effective 2023											
	Month												
Year	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
2014	$ 9,445.40	$ 7,488.22	$ 8,328.85	$ 9,590.29	$ 10,055.08	$ 9,421.77	$ 11,270.47	$ 8,825.59	$ 10,288.57	$ 9,889.95	$ 8,554.62	$ 10,270.00	**$ 113,428.82**
2015	$ 8,689.14	$ 7,816.44	$ 9,363.07	$ 11,482.62	$ 9,536.41	$ 11,536.99	$ 11,185.49	$ 9,713.48	$ 10,768.19	$ 10,432.01	$ 9,610.18	$ 11,147.16	**$ 121,281.18**
2016	$ 8,670.70	$ 8,487.48	$ 9,041.66	$ 8,849.22	$ 9,749.04	$ 11,262.76	$ 9,514.11	$ 10,408.74	$ 9,884.04	$ 9,600.05	$ 10,537.72	$ 9,653.45	**$ 115,658.96**
2017	$ 9,454.32	$ 8,007.74	$ 8,707.58	$ 9,490.36	$ 11,038.32	$ 10,901.02	$ 10,053.88	$ 10,640.30	$ 9,642.60	$ 10,396.45	$ 10,386.69	$ 8,646.83	**$ 117,366.09**
2018	$ 9,448.90	$ 8,302.94	$ 8,582.46	$ 9,450.22	$ 10,889.33	$ 9,540.99	$ 11,545.24	$ 11,674.47	$ 10,718.95	$ 12,703.52	$ 11,084.30	$ 10,011.67	**$ 123,952.98**
2019	$ 10,386.28	$ 8,881.44	$ 9,385.68	$ 10,832.11	$ 11,605.70	$ 9,962.10	$ 11,919.58	$ 10,630.43	$ 10,224.10	$ 11,021.93	$ 9,336.66	$ 10,172.62	**$ 124,358.62**
TOTAL	**$ 56,094.73**	**$ 48,984.25**	**$ 53,409.31**	**$ 59,694.82**	**$ 62,873.88**	**$ 62,625.63**	**$ 65,488.77**	**$ 61,893.01**	**$ 61,526.44**	**$ 64,043.91**	**$ 59,510.16**	**$ 59,901.74**	**$ 716,046.66**
											Average annual cost-savings:		$ 119,341.11

BEST PRACTICES

This section provides the research conducted as part of the literature review for the Study. The section begins with an overview of the case studies from 11 local governments researched and continues onto best practices for organics diversion at events, municipal application of finished compost, and organics diversion from commercial food businesses.

1. CASE STUDIES

Many municipalities throughout the United States have implemented organics diversion programs of varying scopes and structures, and their successes, challenges, and lessons learned serve as a resource for other local governments in the planning and development of their own local programs. For this Study, publicly available information on the refuse, recycling, and composting programs and services for 11 local governments as well as for the City of Kingston and two laws that affect the City of Kingston, were reviewed. The full case studies for the 11 local governments reviewed appear in the Study Appendices, Appendix H. Case Studies. An overview of the case studies has been included in this Study.

In addition to "organics diversion", these programs may be referred to by a variety of names, such as "food scraps recycling", "food waste composting", and "composting", among others. Additionally, some municipal programs offer separate food and/or yard waste collection, while others combine them. For the sake of clarity, all programs are collectively referred to as "organics diversion" programs generally, or, if applicable, "food waste" specifically in this Study, unless individual municipal programs are being referenced.

A. HIGHLIGHTS AND PROGRAM CONSIDERATIONS

Research of specific municipal organics diversion programs revealed strategies and best practices employed by some municipalities, and some recommendations stood out as particularly applicable for Kingston. In this section the format is to highlight the strategy or best practice, give examples of communities implementing this practice (detailed further in this "Case Studies" and in this Study's Appendices, Appendix H. Case Studies), and explain the local context or program considerations related to that best practice for Kingston. At the end of the section, program considerations are summarized; the US EPA tool is also provided.

A.1. HIGHLIGHTS

1. DROP-OFF ORGANICS DIVERSION SITES

Many smaller communities begin their food scrap collection with drop off locations for residents and/or incorporate drop off locations into their overall program.

1.1. Examples

Ann Arbor, MI; Iowa City, IA; Saugerties, NY; and Scarsdale, NY.

1.2. Local Context / Considerations

Kingston may consider creating a drop-off organics diversion site in addition to curbside pickup of organics as its transfer station is already open to the public to drop off electronic equipment, solid waste, and recycling. It could enable easier collection of organics after large events if the event producers can simply drop off the organics themselves rather than pay to have them carted away.

2. IMPLEMENTING A PILOT PROGRAM

Many of the communities profiled implemented pilot organics diversion programs in advance of a full program roll-out, and used the results and lessons learned to inform further development and expansion of their local programs. Pilot programs included surveying participants, data collection, and establishment of best practices, with resulting reports and plans, etc. For example, through its pilot program, Cambridge, MA found that an average of 6.6 pounds of food waste was collected per household and concluded that distributing "starter kits" at no cost, along with recommending or requiring bin liners in the kitchen collector, were both good practices to continue with the expansion of their program.

2.1. Examples

Cambridge, MA; New York City, NY; and Portland, OR.

2.2. Local Context / Considerations

The pilot programs listed here are mostly for larger communities where implementing a pilot is more practical than starting hundreds of thousands of households with organics collection at once. As a very small city with a robust recycling outreach protocol, Kingston may consider itself well-equipped to handle organics collection with an opt-in program rather than a pilot.

3. IMPLEMENTING AN OPT-IN PROGRAM

In advance of mandating organics diversion, no case study communities mandated organics diversion without first conducting a pilot or making it an opt-in program. Many communities have done an opt-in program and found it to be an effective method to ensure community buy-in and low contamination rates.

3.1. Examples

Ann Arbor, MI; Iowa City, IA; Longmont, CO; Minneapolis, MN; and Scarsdale, NY.

3.2. Local Context / Considerations

It is recommended that Kingston begin curbside organics pickup as an opt-in program – an action that most smaller cities profiled in this study have taken. However, most communities also have not strayed beyond the opt-in program. To avoid this scenario, in which organics diversion is not mandated and therefore is not taken up by every resident or business, it is recommended that Kingston create a timeline at the outset of this project for implementation of the opt-in program and when a mandate will go into effect.

4. PAY AS YOU THROW / RIGHT-SIZING BINS / REDUCED TRASH PICKUP

These three separate but related strategies are included together since they all work towards ensuring that organics diversion and recycling are incentivized over refuse disposal. Right-sizing bins

gives residents the option for a smaller refuse can, and the inclusion of Pay As You Throw (PAYT), meaning they would either pay less for the smaller refuse can, pay by the refuse bag, or and/or opt-in to reduced refuse collection, ensures customers pay less for smaller refuse bins and/or decreased collection frequency. A critical piece of this strategy is that organics diversion and/or recycling should be offered at lower or no cost, with increased collection frequency compared to refuse collection. The City of Portland even provides customers an every-four-weeks refuse collection option for a further-reduced rate.

4.1. Examples

Longmont, CO; Minneapolis, MN; Portland, OR; San Francisco, CA; and Seattle, WA, all offer variable rates by refuse cart size and/or collection frequency. Ann Arbor and Iowa City offer refuse carts smaller than their largest organics cart size. Organics cart sizes range from 6 to 96 gallons. Scarsdale is the only community that does not offer a bin over 13 gallons. A detailed breakdown of bin size and collection frequency by community is provided in this Study's Appendices, Appendix H. Case Studies, with an overview provided in this section under "Collection Synopsis".

4.2. Local Context / Considerations

Some combination of PAYT, right-sizing bins, and reduced refuse pickup is a cost-effective way to ensure organics recycling is incentivized for customers. While Kingston currently does not have residents pay for garbage collection, creating a small cost for garbage collection, but making organics diversion and recycling free may help ensure greater participation once this program rolls out. As an alternative, if it is not politically feasible to add a charge for garbage collection when the organics diversion program begins, delivering smaller refuse bins or bi-weekly collection to encourage participation in the organics diversion program may be considered.

5. MANDATING ORGANICS DIVERSION AT RESIDENCES AND BUSINESSES

No community in the case studies has mandated organics diversion for residences and businesses except for the three large West Coast cities. These longest-standing and most successful organics diversion programs are in places where every household and business is required to separate their food scraps from their refuse. San Francisco and Portland both outsource their refuse, recycling, and organics diversion collection to private haulers. Seattle has a sanitation department that picks up refuse. This divide is seen in the ordinances for the three locations: San Francisco's ordinance is 27 pages long and Portland has two separate rules books for Residential and Commercial refuse service totaling more than 80 pages, while, in contrast, Seattle's ordinances for organics diversion are a few pages of code, at most, sprinkled into their sanitation section.

5.1. Examples

Portland, OR; San Francisco, CA; and Seattle, WA.

5.2. Local Context / Considerations

To ensure full implementation of organics recycling in Kingston, an ordinance mandating it should be considered. Mandating organics diversion would make Kingston a national leader, both for the size of its community and location on the East Coast. Seattle's model of refuse collection is closest to Kingston's and therefore it is recommended to follow their ordinance style.

As stated above in "Implementing an Opt-In Program", it is recommended that Kingston first let residents and/or businesses served by the City's sanitation department opt-in to organics diversion. This strategy will resolve any issues that arise and adjust the program as necessary with the early adopters rather than the entire municipality. Kingston may want to consider first rolling out the mandate to every residence and business with a waiver on fines – while still tagging and/or not collecting contaminated compost bins. Finally, the mandate would align the program with Kingston's current fee system for non-compliance with recycling and refuse collection rules.

6. MANDATING ORGANICS DIVERSION AT EVENTS

Communities that mandate organics diversion for residences and businesses also mandate organics diversion at events. These communities also provide varying levels of guidance and materials to assist in the collection of compostable materials. San Francisco provides the most robust outreach and assistance for event producers, including requiring that they attend a training and produce a recycling plan. Other communities provide printable signs and factsheets for vendors. Seattle has a separate law requiring food service businesses, including events, to only use recyclable or compostable containers.

6.1. Examples

San Francisco, CA, and Seattle, WA.

6.2. Local Context / Considerations

If Kingston chooses to pursue mandating organics diversion similar to the two West Coast cities given as examples, mandating compostable materials collection at events makes sense. The City's 2019 special event application[322] states, "Applicant is required to provide both refuse and recycling receptacles for events where refuse is generated. The City will supply these upon request at a cost of $20 per tote." The City may consider adding compostable material receptacles to this list once the mandate is in effect.

The City may consider creating a requirement for a waste plan or review of materials/video content before a permit can be issued, similar to San Francisco. Even if this more detailed option is not taken, the City may consider providing printable (or actual printed, upon request) signs or stickers for permit holders to help them adequately separate waste, recyclables, and organics. Depending on the materials included in the organics collection program, the City may consider an additional complementary law similar to Seattle's requiring businesses to use recyclable or compostable containers to decrease solid waste associated with takeout containers and increase organics collection.

7. YARD WASTE IN CURBSIDE FOOD WASTE COLLECTION BINS

The decision to include yard waste in the organics collection or leave it separate depends on a few factors. First, it will depend on the size of the food scrap collection bins chosen. In addition, in more suburban communities where the food scrap bins are quite small, such as Scarsdale, yard waste is treated separately. However, many bigger cities, where residents have less yard waste to deal with, yard waste can intermingle with food scraps. These communities have specific criteria for what yard

[322] "City of Kingston Special Event Application", City of Kingston, 2019, https://kingston-ny.gov/filestorage/8463/10792/26341/Special_Event_Application_2019.pdf.

waste is allowed in the bin versus needs to be wrapped in twine or taken to the transfer station directly.

7.1. Examples

Ann Arbor, MI, Iowa City, IA, Longmont, CO, New York City, NY, Portland, OR, San Francisco, CA, and Seattle, WA, all allow yard waste to be added to the curbside organics cart. Cambridge, MA, Minneapolis, MN, and Scarsdale, NY do not. Cambridge presumably does not because their food scraps are not composted but used to generate power. All three of these communities also require food scraps to be bagged for curbside pickup. Cambridge and Scarsdale also have particularly small curbside organics bins, while Minneapolis' bins are similar to the larger bins chosen by most communities profiled. The full breakdown of bin size by community is provided in this Study's Appendices, Appendix H. Case Studies, and in this section in "Collection Synopsis".

7.2. Local Context / Considerations

Kingston has robust criteria in the City Code related to yard waste pickup. The City's Public Works Department already picks up yard waste and allows yard waste to be placed in a receptacle, or biodegradable bags. Therefore, it makes sense to allow yard waste to be placed in the curbside compostables container, assuming larger curbside bins are chosen for the program. The size of yard waste (length and diameter) as well as weight allowed in the container should be mandated. If Kingston chooses to include yard waste in their organics diversion program, bins above 20 gallons should be chosen with perhaps two bin sizes offered for those who would like to divert large quantities of yard waste to their bin. Even if Kingston decides to not include yard waste in their curbside organics diversion program, the City should ensure that the bins have at least a 13 gallon capacity and perhaps offer a larger bin as an option. Given feedback from residents about the large container size chosen for recycling bins, Kingston may consider offering multiple options or surveying residents on the size of organics bin they would prefer.

8. USE OF BIN LINERS / COMPOSTABLE BAGS FOR ORGANICS

Some communities require that residents use bin liners or compostable bags for their curbside bin. Some communities require compostable plastic liners, while others allow paper bags inside the larger curbside bin. Requiring liners is more common in places that have long freezing periods in the winter. It is not a requirement in any of the West Coast cities with organics diversion mandates.

8.1. Examples

Cambridge, MA, Minneapolis, MN, and Scarsdale, NY, all have bin liner mandates. Ann Arbor, MI, and Iowa City, IA, are cold climate communities with opt-in organics recycling programs that do not have mandates for compostable bag liners. Ann Arbor does not collect organics in the winter months, Iowa City gives several "Wintertime Collection Tips" on their webpage, which includes using compostable bags as liners and leaving the curbside cart (which is small) inside until 7am on pickup day. Longmont, CO, does not have a liner mandate and is in a cold climate. They also do not have information on their website about preventing the cart from freezing.

8.2. Local Context / Considerations

Plenty of communities with successful programs do not mandate compostable bags. However, use of compostable bags is likely to reduce mess, reduce material freezing into the cart in the winter, and

make organics diversion more appealing for hesitant residents and businesses. Purchase of compostable bags would be an additional ongoing expense for Kingston residents. Rather than deciding whether to require compostable plastic bag liners, the decision should be based upon reducing freezing of material in the winter. Minneapolis may have the simplest way of dealing with this, not requiring compostable bags, but simply some sort of organic material containment system such as paper bags. This will give residents a cheaper option than continually purchasing compostable plastic bags while preventing material freezing in the winter.

9. STARTER KITS

The Village of Scarsdale sells $20-25 starter kits at the transfer station; these include a 2-gallon kitchen bin, either a 6- or 13-gallon transport bin, an instructional booklet, and a roll of 25 compostable bags. Other communities provide the kitchen pail, and sometimes additional materials as part of a kit, for free. Cambridge concluded from their pilot program that it is important to "provide supplies for free to make participating easy".

9.1. Examples

Cambridge, MA, San Francisco, CA, and Scarsdale, NY, all provide inexpensive or free materials to help residents get started, including a kitchen collection pail.

9.2. Local Context / Considerations

Rather than commit to the ongoing expense of providing kitchen collection pails and/or compostable plastic bags for free, Kingston may consider focusing resources on implementing robust education and outreach along with a small fee for a kitchen pail.

10. EDUCATIONAL & OUTREACH MATERIALS

Many municipalities have pursued various public engagement strategies to recruit participants and promote compliance, such as placing A-frame signs in neighborhoods, distributing flyers and tabling at community meetings and events, mailers, sending flyers home from public schools, stakeholder meetings, emails and surveys, and communicating with both residents and landlords of multifamily properties to obtain buy-in, among many others.

10.1. Examples

All communities profiled in the case studies have pursued some sort of educational campaigns.

10.2. Local Context / Considerations

Ensuring broad awareness and understanding about the roll out of the organics collection program in Kingston will mean better diversion rates and less contamination. Education is a wise investment to ensure the program gets off to a successful start. Currently, the City of Kingston waste management information is presented to stakeholders on one single page of the City's website. This presentation makes it difficult to find exactly what information the user is looking for. The City may want to consider putting basic information – such as collection information, holidays, scheduling, and contact on one page at the top, followed by a feature to look up how to dispose of materials. Then, there could be hyperlinks to other pages for recycling, composting, and waste disposal. On each of those pages there should be information about each method presented with clear images. Additional recommendations are bulleted below:

- Kingston should consider creating a brochure that is presented as a trifold. The most effective example with the best presentation and readability was Cambridge, Massachusetts. A trifold mailing similar to Cambridge would be an effective way to ensure people do not get recycling, waste, and compost information mixed up. Adding a QR code to the brochure that links to the lookup feature would be a great way to limit the amount of information presented on the brochure, while still giving readers the ability to find exactly what they need.
- As a model for the formatting of Kingston's website, Kingston may consider using Longmont, Iowa City, and Ann Arbor as examples. These municipalities present their information in a way that could be mirrored by the City of Kingston without requiring a complete redesign of the website. To create more resources available to stakeholders, such as signs, stickers, newsletters, and articles, the Kingston may consider using New York City and Minneapolis as models.
- A possible hurdle may be that Kingston's website is outdated and there may not be enough funding or capacity to create tools such as product and address lookups. Revamping the City of Kingston's Waste Management website will also require a significant amount of staff time, and would need to include the IT department. However, to effectively communicate and engage with the community, investments in messaging are critical to the success of a new or existing solid waste management program.
- Kingston's brochure design will need to be informed by the type of organics accepted by the processor.
- Many larger cities rely more on images of acceptable material rather than words, in part due to the diversity of languages spoken by their residents. Kingston may consider translation services for its brochures or rely more on images to make the materials as accessible as possible for all its residents.

A.2. COLLECTION SYNOPSIS

In addition to the topics synopsized in the previous sections, information on bin sizes and collection frequency for all waste streams and on the combining of yard waste with food waste are synopsized in the below tables for those local governments offering curbside food waste collection.

Table 58. Municipal Case Studies – Curbside Bin Size

Local Governments	Curbside Bin Size (gallons)			Food + Yard Waste	Notes
	Refuse	Recycling	Food Waste		
Ann Arbor	32-96	32-96	64-96	Yes	Food waste collection is provided seasonally, April-December.
Cambridge	50	65-95	12-35	No	
Iowa City	65	65	25-95	Yes	
Longmont	48-96	96	96	Yes	Variable rates by trash cart size / collection frequency.
Minneapolis	32-96	64-96	32-64	No	Variable rates by trash cart size.
New York City	55	32	13-21	Yes	
Portland	20-90	60	60	Yes	Variable rates by trash cart size / collection frequency.
San Francisco	16	64	32	Yes	For standard service, variable rates are offered for all curbside carts/sizes.
Scarsdale	30	65	6-13	No	
Seattle	12-96	96	13-96	Yes	Variable rates by trash and compost cart sizes.

Table 59. Municipal Case Studies – Curbside Collection Frequency

Local Governments	Collection Frequency			Notes
	Refuse	Recycling	Food Waste	
Ann Arbor	weekly	weekly	weekly	
Cambridge	weekly	weekly	weekly	
Iowa City	weekly	weekly	weekly	Glass not accepted in recycling; may be taken to recycling drop-off locations.
Longmont	weekly	every other week	every other week	Option for every other week trash collection.
Minneapolis	weekly	every other week	weekly	
New York City	more than weekly	weekly	weekly	Trash collected twice weekly.
Portland	every other week	weekly	weekly	Option for every-four-weeks trash collection.
San Francisco	weekly	weekly	weekly	
Scarsdale	more than weekly	weekly	weekly	Trash collected twice weekly. Mixed paper recycling collected semi-weekly.
Seattle	weekly	every other week	weekly	

Table 60. Curbside Collection Frequency Synopsis

Collection Frequency	Number of Local Governments		
	Refuse	Recycling	Food Waste
weekly	7	7	9
more than weekly	2	0	0
every other week	1	3	1

B. RECOMMENDATIONS FROM CASE STUDIES

- **Consider the creation of an opt-in curbside organics diversion program with a plan and timeline for mandating organics diversion across City residences and businesses.** A curbside program could include offering reasonably priced starter kits for residents, including a kitchen pail, as part of the public outreach and education campaign. Requiring food scraps to be bagged, particularly during the winter months to prevent material freezing to the bin, should also be considered.
- **Consider offering multiple sizes of curbside bins, no smaller than 13-gallon capacity if yard waste is not allowed in the bin, and no smaller than 20 gallon capacity, and perhaps larger, if including yard waste in the program.** However, the bins chosen should take into account that Kingston residences already have three bins and space is limited and ensure the bins are not too large. Depending on the composting facility, yard waste of a certain size (length and diameter) and weight could be placed in the curbside bin.
- **Consider right-sizing collection bins, offering trash pickup every other week, and perhaps charging more for a larger bin size or trash pickup more often.** There are two potential options for Kingston related to this recommendation, as the City currently does not charge for refuse and recycling pickup for residences. First, Kingston could maintain the current structure but cease offering weekly refuse pickup to incentivize using the compostable bin for food scraps, which would be picked up weekly. This would work best after the mandate goes into effect. Second, Kingston could create a monthly fee structure for refuse collection and offer cheaper rates for smaller refuse bins or collection less often. This would further incentivize organics diversion and recycling.
- **Consider mandating organics diversion through an ordinance.** After the opt-in program phase, consider creating a concise and clear residential ordinance based on Seattle, which has its own sanitation department do the collection and therefore is most similar to Kingston's model. Draft ordinance changes in this Study in "Municipal Code". Additional ordinance changes include requiring that private haulers offer organics diversion to those they service. Phase in organics diversion requirements for businesses over time, based on NYC, including those with private haulers.
- **Consider mandating organics diversion at events.** Kingston may consider mandating organics diversion for events hosted at City properties and requiring a permit. This could be accomplished with simple edits to the special event application form already in use by Kingston, which already mandates recycling and refuse collection for event producers. Kingston may also consider providing fact sheets, signage, etc. to event producers when they apply for a permit. Additionally, Kingston may consider implementing additional requirements, such as the creation of a waste plan or review of content, for event producers before they are issued a permit. Kingston may also consider an additional complementary ordinance for businesses and

events targeting takeout containers that requires they be recyclable or compostable, to increase diversion. Draft ordinance changes are found in “Municipal Code”.

- **Consider updating the DPW waste management webpage to reflect best practices in the case studies listed here and create collateral materials to assist residents and businesses in effectively sorting their waste.**

C. MANAGING & TRANSFORMING WASTE STREAMS – A TOOL FOR COMMUNITIES

The Managing and Transforming Waste Streams Tool is a policy and program planning tool developed by US EPA.[323] It is provided in this Study due to the tool's comprehensive waste reduction options. The tool allows for filtering when accessed online and can be downloaded in excel.[324] The US EPA description for the qualitative rankings (in blue) for policies and programs presented (in beige/yellow) appear at the end of this table.

Table 61. US EPA Managing & Transforming Waste Streams

Diversion Potential	Upstream Impacts	Local Authority	Receptivity	Staff Knowledge	Community Led Initiatives	Policy or Program	Policy or Program Description	Sector(s)	Material or Product Group
High	Low	High	Med	Med	Diff	**Anaerobic Digestion**	Develop or contract for local or regional anaerobic digestion facilities for processing food waste, Fats, Oil and Grease (FOG) and/or sewage sludge.	Residential, ICI	Organics
Low	Med	Low	Easy	Med	Easy	**Backyard/ Neighborhood Composting**	Encourage and provide incentives for homes, neighborhoods, schools and businesses to set up a bin for composting food and yard waste. (Considered a source reduction activity with upstream impacts.)	Residential, ICI	Organics
Low	Low	Low	Easy	Low	Easy	**Best Practices Training**	Conduct training, e.g., site visits, walk-through audits, distribution of displays and signs to increase rates of recycling and/or composting at facilities.	ICI	Paper, Plastics, Metals, Glass, Organics
High	High	Med	Diff	High	Diff	**C&D Diversion Requirements**	Adopt requirements for C&D recycling/reuse in a C&D or Green Building ordinance or building permit.	C&D projects	C&D
Med	Low	Med	Diff	High	Diff	**C&D Mandatory Source Separation**	Require contractors to separate recyclable C&D debris from non-recyclable materials and sort the recyclables on site by staff or a service. Alternatively, require the recycled materials be hauled to a facility that sorts C&D materials.	C&D projects	C&D
Low	Low	Med	Med	Low	Med	**C&D Permit Incentives - Preference & Credits**	Give preferential treatment and/or permit credits for projects that meet Green Building/Sustainable Building Product policies.	C&D projects	C&D
High	Low	Med	Diff	Med	Med	**C&D Permit Incentives - Refundable Fee**	Charge a deposit for permitted projects, refundable upon permittee demonstrating that a high percentage, e.g., 75%, of C&D debris has been delivered to a recovery facility.	C&D projects	C&D
Med	High	Med	Med	High	Diff	**C&D Policy Incentives - Adaptive Reuse**	Provide incentives to developers, e.g., streamlined permit review, permit fee reductions, flexibility in parking requirements, to support "adaptive reuse" of older or historic buildings to new uses.	C&D projects	C&D
Low	Low	Med	Diff	High	Diff	**C&D Policy Incentives - Recycling**	Update Green Building Policy to provide incentives attractive to developers, e.g., higher development ratios, lower set-backs, or credits for use of materials made from recycled content or for on-site reuse and recycling.	C&D projects	C&D
High	Low	High	Med	Med	Diff	**C&D Recovery Facility - Inerts**	Develop or contract for local or regional C&D Recovery facilities to recover inert materials (e.g., rock, asphalt, concrete, bricks).	C&D projects, Government	C&D
Med	Low	High	Med	Med	Diff	**C&D Recovery Facility - Organics**	Develop or contract for local or regional C&D Recovery facilities to recover organic materials (e.g., wood).	C&D projects	C&D
Low	Low	Low	Easy	Low	Easy	**C&D Recycling/Reuse Guidance**	Prepare and post on the web a how-to deconstruction and services guide.	C&D projects	C&D

[323] Examples and resources for reducing waste in landfills are also available at https://www.epa.gov/transforming-waste-tool/browse-examples-and-resources-transforming-waste-streams-communities.

[324] https://www.epa.gov/transforming-waste-tool/managing-and-transforming-waste-streams-tool.

High	Low	High	Med	Med	Diff	**C&D Service Rate Incentives**	Require C&D processing facility(ies) to provide financial incentives to increase recovery rates, e.g., lower tipping fees, pre-sorting discounts, coupons, and/or expedited service.	C&D projects	C&D
Low	Low	High	Easy	Med	Diff	**Center for Hard to Recycle Materials**	Develop or contract for facilities that accept materials that are hard to recycle for reuse, refurbishing and /or recycling.	Residential, ICI	HHW, Hard to Recycle, Scrap Metal, Motor Oil, Various
High	Low	High	Med	Med	Diff	**Compost Processing**	Develop or contract for local or regional compost processing facilities for yard debris and/or food waste.	Residential, ICI	Organics
Med	Low	High	Med	High	Diff	**Curbside Collection Optimization**	Upgrade curbside recycling and/or organics containers and improve collection efficiencies (e.g., move from bins to carts, include additional materials, consider degree of commingling).	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
Low	High	Med	Med	High	Diff	**Demolition Permit Publication**	Require publication in the local newspaper of all building demolition permit applications to solicit salvage of reusable items by deconstruction firms.	C&D projects	C&D
Low	Low	Med	Med	Med	Med	**Drop-Off - Compostables**	Partner with nonprofit agencies and local retailers to accept and/or establish locations in the community for drop-off of compostable items, such as yard debris, non-reusable wood, food waste and pet waste.	Community	Organics
Low	Low	Med	Med	Med	Med	**Drop-Off - Miscellaneous**	Promote collection hubs in the community for hazardous products, medical waste and hard to recycle items, e.g., oil, antifreeze, paint, tires, batteries, pharmaceuticals, carpet. Encourage management of collected items by manufacturers or retailers.	Community, ICI	HHW, Hard to Recycle, Motor Oil, Various
Low	Low	Med	Easy	Low	Easy	**Drop-Off - Recyclables**	Partner with nonprofit agencies, e-Steward recyclers, or B-corporation certified recyclers to accept and/or establish locations in the community for drop-off of recyclable items, including those that contain toxics or are bulky and hard to handle.	Community	Electronics, Textiles, HHW, Scrap Metal, Hard to Handle, Various
Low	Med	Med	Easy	Low	Easy	**Drop-Off - Reusables**	Partner with nonprofit agencies and local retailers to accept and/or establish locations in the community for drop-off of reusable or refurnishable items, including those that are bulky and hard to handle.	Community	Textiles, Hard to Handle, Various
Med	Low	High	Diff	Med	Diff	**Every-Other-Week Trash Collection**	Modify trash collection schedule to every-other-week pickup and, at the same time, add or expand weekly organics collection. To reduce contamination from residences, address diaper and pet waste disposal through education and/or separate pickup.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
Med	Low	High	Diff	High	Diff	**Expanded Authority for Service**	Expand municipal authority to provide or oversee collection services for sectors served by open market private haulers (if applicable).	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
High	Low	High	Med	Med	Diff	**Expanded Municipal Collection - Food Waste**	Expand existing collection services to food waste (and soiled paper).	Residential, ICI	Organics
Med	Low	High	Diff	High	Diff	**Expanded Municipal Collection - Multi-Family**	Expand existing collection services to include multi-family units.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
Med	Low	High	Med	Med	Diff	**Expanded Municipal Collection - Recyclables**	Expand curb/dockside collection services to include recyclable items that contain toxic materials or are bulky and hard to handle.	Residential, ICI	Electronics, HHW, Hard to Handle, Scrap Metal, Motor Oil, Textiles
High	Low	High	Med	Med	Diff	**Expanded Municipal Collection - Yard Debris**	Expand existing collection services to yard debris/green waste.	Residential, ICI	Organics
Low	Med	Med	Med	Med	Med	**Extended Producer Responsibility (compliance)**	Promote producer compliance in managing the reuse, recycling and/or safe disposal of products covered by EPR legislation.	ICI	Various, Electronics
Low	Med	Low	Med	Med	Easy	**Extended Producer Responsibility (legislation)**	Advocate for Producer Responsibility legislation and programs, e.g., through participating in Product Stewardship Councils and/or adopting local resolutions.	ICI	Various, Electronics
Low	High	Med	Diff	High	Diff	**Fees on Disposable Items**	Adopt an ordinance that places a fee on the sale of certain disposable items, such as disposable shopping bags, to incentivize customer reuse.	ICI	Plastics, Paper, Various

Low	Low	Low	Easy	Low	Easy	**Flea Markets, Garage Sales, and Reuse Swaps**	Promote local flea markets and garage sales for sale of reusable items and swaps for household goods, e.g., clothing, toys, etc.	Community	Textiles, Various
Low	Med	Low	Easy	Low	Med	**Food Gleaning for Donation**	Encourage formation of "Gleaner" volunteer groups to harvest surplus crops from local farms or community gardens and distribute to food banks or soup kitchens.	Community	Organics
Med	Med	Low	Easy	Med	Med	**Food Pickup for Donation**	Encourage pick-up and delivery of pre-consumer, edible food from food service vendors for donation to food banks or soup kitchens, e.g., by bicycle or electric cart.	ICI	Organics
Med	Low	Med	Easy	Med	Easy	**Food Waste Collection Program with Private Haulers**	Initiate a sign-up program for businesses and institutions that discard food waste to obtain compost bins and collection service.	ICI	Organics
Low	Med	Low	Easy	Med	Med	**Food Waste Outreach & Prevention (consumers)**	Conduct outreach on reducing wasted food at home.	Residential	Organics
Low	Med	Low	Easy	Med	Easy	**Food Waste Outreach & Prevention (vendors)**	Conduct outreach to grocery stores, restaurants, school cafeterias and other food service vendors on opportunities and practices to prevent food waste, as well as to reduce disposable food ware packaging.	ICI	Organics, Paper, Plastics
Low	Low	Low	Easy	Low	Med	**Food Waste Pickup for Composting**	Encourage pick-up and delivery of food waste from food service vendors for composting by community gardens or small farms if allowed, e.g., by bicycle or electric cart.	ICI	Organics
Med	Med	Med	Easy	Med	Easy	**Goal Integration Across Plans**	Make linkages between achieving high diversion and how this would serve objectives of other plans for the community, including Climate Action, Sustainability, General and Economic Development Plans.	Community	Various
Med	Med	High	Med	Med	Diff	**Healthy Soils - Landscapes**	Require or offer incentives for use of compost to restore soil, e.g., through local stormwater ordinances or programs for retrofitting residential and commercial landscapes; support carbon farm projects.	C&D projects, ICI, Residential	Organics
Low	Med	High	Med	Med	Diff	**Healthy Soils - Locally Grown Food**	Support the establishment of community gardens, urban agriculture, and farmers markets offering organic, locally grown food, e.g., by enacting changes to local zoning ordinances.	Community	Organics
Med	Med	Med	Med	Med	Easy	**High Diversion Goal/Plan**	Adopt a goal and plan for reaching 50% or more diversion from landfilling and combustion by a specific year through "reduce and reuse" as well as recycling and composting.	Community	Various
High	High	Med	Diff	High	Diff	**Landfill Ban - Organics**	Adopt an ordinance to limit, then ban organics from refuse collection and from entering local transfer stations, landfills and incinerators; support adoption regionally and statewide after expanding composting and digestion programs as needed.	Community	Organics
High	High	Med	Diff	High	Diff	**Landfill Ban - Recyclables**	Adopt an ordinance to ban specific recyclable or toxic materials from entering local transfer stations, landfills, and incinerators.	Community	Paper, Plastics, Metals, Glass, Electronics, HHW, C&D, Various
Med	High	Med	Easy	Med	Diff	**Lead by Example - Zero Waste Procurement**	Incorporate Zero Waste objectives into contractual purchases and services, e.g., avoiding purchase of disposable goods, minimal waste in product and packaging design, product take-back services, and lifecycle analysis.	Government	Various
Med	High	Med	Easy	Low	Diff	**Lead by Example - Green Procurement (mandatory)**	Require green purchasing practices in contractual agreements.	Government	Various, Electronics
Low	High	Low	Easy	Low	Med	**Lead by Example - Green Procurement (voluntary)**	Encourage green purchasing practices; pursue regional purchasing cooperatives to buy recycled products; adopt the "precautionary principle" for purchases and services and support regionally.	Government	Various
Low	Low	Med	Med	Med	Diff	**Lead by Example - Recycling and/or Composting**	Establish non-binding recycling targets with service provider; provide technical assistance across government operations (e.g., police, fire, facilities, parks and public areas, venues and events) to increase recycling and/or composting rates.	Government	Paper, Plastics, Glass, Metals, Organics, Various
Med	High	Med	Easy	Med	Med	**Lead by Example - Road Construction**	Incorporate reusable and recycled materials into municipal road construction and maintenance projects; support adoption regionally.	Government, C&D projects	C&D, Industrial Materials

Med	Low	Med	Diff	High	Diff	**Licensing with Reporting**	License all haulers (as an alternative to a franchise agreement or contract). Require haulers to report the amount of garbage, recyclables, and compostables collected.	Residential, ICI	Paper, Plastics, Glass, Metals, Organics
High	Med	Med	Diff	High	Diff	**Mandatory Composting**	Require by ordinance compliance of households or businesses with composting and/or properly separating organics from refuse.	Residential, ICI	Organics
High	Med	Med	Diff	High	Diff	**Mandatory Recycling / Source Separation**	Require by ordinance compliance of households or businesses with recycling / properly separating recyclables from refuse.	Residential, ICI	Paper, Plastics, Metals, Glass
High	Med	Med	Diff	High	Diff	**Mandatory Recycling Percentage**	Require by ordinance that owners of businesses, institutions, or multi-family complexes recycle a specific percentage of solid waste generated.	Residential, ICI	Paper, Plastics, Metals, Glass
Med	Low	Med	Diff	Med	Diff	**Mandatory Subscription - Organics**	Require all households and/or businesses and institutions that dispose organics within jurisdictional boundaries to sign up for organics collection service.	Residential, ICI	Organics
Med	Low	Med	Diff	Med	Diff	**Mandatory Subscription - Recycling**	Require all households and/or businesses and institutions within jurisdictional boundaries to sign up for recycling collection service.	Residential, ICI	Paper, Plastics, Metals, Glass
Low	Low	Low	Easy	Med	Easy	**Market Development Opportunities Assessment**	Assess the state of existing local and regional markets for materials across the waste stream; study service voids for missed opportunities to recover commodities. Shape strategic action plans around the findings.	Community	Various
Med	High	Low	Easy	Med	Med	**Materials Exchange**	Develop or facilitate an online network to foster business-to-business connections to match unwanted material byproducts or commodities to opportunities for reuse or recycling as feedstock.	ICI	Industrial Materials, C&D, Hard to Recycle, Textiles, Electronics, Various
Med	Low	Low	Easy	High	Diff	**Multi-Family Technical Assistance**	Provide outreach and technical assistance to owners and tenants of multi-family units to address recycling and/or composting logistics and to increase tenant participation.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
High	Low	High	Med	Med	Diff	**Municipal Recycling Collection Services**	Establish curb/dockside recycling collection services for readily recyclable materials.	Residential, ICI	Paper, Plastics, Metals, Glass
Low	Low	Low	Easy	Low	Easy	**Outreach & Education**	Promote best practices for source reduction or organize volunteer opportunities for residents to promote waste reduction, reuse, recycling, and composting.	Community	Various
Low	Med	Low	Easy	Low	Easy	**Paper Reduction at Offices**	Conduct outreach on "Paperless Office" strategies.	ICI	Paper
High	Med	Med	Med	Med	Diff	**Pay-As-You-Throw (PAYT)**	Enact a volume-based fee structure for trash.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
Med	Low	High	Med	Med	Diff	**Pre-Disposal Residuals Treatment**	Develop or contract for a facility to biologically pre-treat trash residuals before disposal to stabilize organic component.	Residential, ICI	Organics
Med	Low	High	Med	Med	Diff	**Pre-Disposal Salvage**	Develop or contract for facilities or sorting lines to remove and recover reusable, recyclable, and compostable materials from source-separated trash.	Residential, ICI	Paper, Plastics, Glass, Metals, Organics
Med	High	Med	Diff	Med	Diff	**Product & Packaging Bans**	Adopt ordinances that limit or ban sales of toxic or hard to recover products and product packaging.	Government, ICI	HHW, Hard to Recycle, Plastics, Various
Low	High	Low	Easy	Med	Med	**Product and Packaging Redesign & Outreach**	Support evaluation and redesign of products and packaging to prevent waste; conduct or promote outreach campaigns to local businesses to reduce or eliminate non-reuseable packaging, transport containers, and serviceware from their processes and retail stores.	ICI	Various
Low	Med	Med	Med	Med	Med	**Product Fees**	Adopt point-of-sale fees for products that are toxic and/or hard to reuse, recycle or compost.	ICI	HHW, Hard to Recycle, Electronics
Low	Low	Low	Med	Med	Easy	**Recognition & Certification Programs (local)**	To increase the level of participation in recycling and composting programs, provide recognition for successes through a Green Business program or a Zero Waste Businesses or Schools program.	ICI	Various
Med	Low	Low	Easy	Low	Easy	**Recognition & Certification Programs (national)**	To encourage businesses and institutions to adopt and implement zero waste or high diversion goals and plans, help connect them to national recognition and/or certification programs.	ICI	Various

Low	High	Low	Easy	Med	Easy	**Recycled Content Buying Cooperative**	Encourage local buying cooperatives or other coordinated approaches for private sector businesses and organizations to procure recycled content products.	ICI	Paper, Plastics, Glass, Metals, Various
Med	High	Low	Easy	Med	Med	**Recycling Market Development Zone**	Launch/participate in a regional initiative to encourage businesses to use recycled materials in their manufacturing processes for new products; collaborate with local economic development staff to provide financial, siting, permit, feedstock, and marketing assistance and incentives to businesses.	Community	Paper, Plastics, Metals, Glass, Organics, C&D, Various
Med	Low	Med	Diff	Med	Diff	**Recycling Provisions**	Require by ordinance that trash collection is contingent on recycling bin set out or that businesses and institutions have recycling plans and/or space for recycling.	Residential, ICI	Paper, Plastics, Glass, Metals, Organics
Low	Low	Low	Easy	Low	Easy	**Rental Business Promotions**	Help promote services that provide short term rentals of reusable goods such as tools, sports equipment, party equipment (tables, chairs, serving utensils), as well as sharing websites.	ICI	Various
Low	Low	Low	Easy	Low	Easy	**Repair/Reuse Workshops**	Sponsor or organize product repair workshops or reuse workshops with local service clubs.	Community	Various
Med	Low	High	Med	Med	Med	**Resource Recovery Park or Center**	Develop or contract for a central facility at which reuse, recycling, and compost processing is co-located with manufacturing and retail businesses.	Residential, ICI	Paper, Plastics, Glass, Metals, Organics, Various
Low	Low	Low	Easy	Low	Easy	**Retail Reuse Promotions**	Encourage retail store “bargain basements” for sale of used clothes and other goods at discounted prices.	ICI	Textiles, Hard to Handle, Various
Med	Low	Med	Diff	Med	Diff	**Retailer Take-back (mandatory)**	Require businesses that sell items that must be collected as HHW or are not currently reusable, recyclable, or compostable locally to take those items back for proper reuse, recycling, or disposal.	ICI	HHW, Hard to Recycle, Electronics
Low	Low	Low	Med	Low	Easy	**Retailer Take-back (voluntary)**	Encourage businesses to take back products and associated packaging, especially items that are toxic in their manufacture, use, or disposal that are not currently reusable, recyclable or compostable locally.	ICI	HHW, Hard to Recycle, Electronics
Low	Med	Low	Easy	Low	Diff	**Reusable or Compostable Diapers**	Promote alternatives to disposable diapers.	Residential	Diapers
Low	Med	Low	Easy	Low	Easy	**Reuse Business Network**	Develop a network of local businesses to repair, refurbish, market and sell used products.	ICI	Various
Low	Med	High	Easy	Low	Easy	**Reuse Center for Sale of Used Goods**	Develop or contract for reuse centers for sale of salvaged building materials and used household items.	Community, C&D projects	C&D, Various
Low	Low	Low	Easy	Low	Easy	**Reuse Closet**	Encourage storing of unwanted office supplies for re-use by employees or staff and teachers.	Government, ICI	Various
Low	Med	High	Easy	Low	Easy	**Reuse Depot/Goods Bank**	Develop or contract for Goods Banks of reusable items for donation to social services programs, teachers, artists and/or the public.	Community	Textiles, Various
Med	Low	Low	Easy	Low	Diff	**Right Size Service**	Provide technical assistance to customers to help them select containers that are the right size for the amount of trash, recyclables, and compostables produced.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
Low	Low	Low	Med	Med	Med	**Rural Recycling Marketing Cooperative**	Collaborate with neighboring small communities to jointly market recyclable materials to attract buyers and receive more competitive pricing from bulk volumes.	Community	Paper, Plastics, Metals, Glass, Various
High	Low	High	Med	High	Diff	**Service Provider Contract and Franchise Agreement Incentives or Requirements**	Amend Service Provider contract or agreement to achieve high diversion by providing incentives or setting requirements, e.g., contract extensions, bonuses or liquidated damages, limited or no disposal payments, required productive use of organics.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
Med	Low	High	Med	High	Diff	**Service Provider Rewards**	Take actions to compensate haulers for recycling or composting, e.g., recycling rebates or worker rewards.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
Med	Med	Med	Med	Low	Med	**Single Stream Recycling**	Streamline recyclables collection by enabling customers to place recyclables into a single bin or cart for added convenience.	Residential, ICI	Paper, Plastics, Metals, Glass
Med	Low	Low	Easy	Med	Med	**Social Marketing**	Develop a social marketing/behavior change marketing program to find the best means to motivate people to reduce, reuse, recycle and compost.	Community	Various

High	Low	High	Diff	High	Diff	**Source Separation Incentives**	Enact discounted rates or fees for separating recyclables and/or compostables from trash.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
Low	Med	High	Easy	Low	Med	**Swap Shed**	Develop or contract for free drop and take areas or sheds at existing centers including transfer stations, recycling centers, landfills and HHW facilities.	Community	HHW, Various
High	Med	High	Diff	High	Diff	**Trash Disposal Surcharge**	Enact taxes or surcharges on the disposal of municipal solid waste to increase the tipping fee relative to recycling or compost.	Residential, ICI	Paper, Plastics, Glass, Metals, Organics
High	Low	Med	Easy	Med	Med	**Universal Access to Service**	Require haulers to offer recycling and/or compostable collection along with trash service to their customers within jurisdictional boundaries.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
High	Med	Med	Med	Med	Med	**Universal Provision of Service**	Require haulers to provide recycling and/or compostable collection along with trash service for their customers within jurisdictional boundaries.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics
Low	Low	Low	Easy	Low	Med	**Website Content - Green Products & Services Directory**	Create a searchable local or regional directory of businesses that offer green products or services, including vendor contact information.	Community	Various
Low	Low	Low	Easy	Low	Med	**Website Content - Recycling /Reuse Directory**	Create a searchable local or regional directory specific to sector and/or industry of how and where to recycle or drop off used consumer products.	Community	Various
Med	Low	Low	Easy	Low	Easy	**Zero Waste Private Venues & Events**	Promote setting of zero waste goals to owners/operators of private venues, e.g., sports stadiums, hotel conferences. Provide training and technical assistance to event coordinators for implementation of zero waste action plans.	ICI	Paper, Plastics, Metals, Glass, Organics
Med	Med	Med	Easy	Med	Med	**Zero Waste Public Venues & Events**	Adopt and implement Zero Waste goals and action plans for all public venues and events. Provide training and technical assistance to venue and event coordinators, displays, and signs.	Government	Paper, Plastics, Metals, Glass, Organics
Med	Low	High	Easy	Low	Diff	**Zero Waste Collection Infrastructure Planning**	Ask Service Provider to develop strategies to transform the current collection infrastructure.	Residential, ICI	Paper, Plastics, Metals, Glass, Organics, Various
High	High	Med	Diff	High	Easy	**Zero Waste Goal/Plan**	Adopt a goal and plan for reaching 90% or more diversion from landfilling and combustion by a specific year through "reduce and reuse" as well as recycling and composting. Consider renaming the Solid Waste Department to the Zero Waste Department.	Community	Various
High	Med	High	Diff	Med	Med	**Zero Waste Goals for Organics**	Adopt a Zero Food Waste hierarchy; adopt a goal to phase out compostable organics from refuse collection and from entering local transfer stations, landfills or incinerators.	Community	Organics

Table 62. Descriptions and Qualitative Rankings for Policies & Programs US EPA Managing & Transforming Waste Streams Tool

Filter Descriptions and Qualitative Rankings for Policies & Programs: **Diversion Potential, Upstream Impacts, Local Authority, Receptivity, Staff Knowledge, Community Led Initiatives**	*Disclaimer: the filter rankings are intended to be used as general guidelines and do not constitute EPA assessments or recommendations; the actual indicator or level of effort addressed by the filter may vary from community to community. This tool is designed to inspire communities to embark on a process to evaluate various policy and program options on a path towards zero waste.*
(1) **Diversion Potential** - What is the measure's tonnage diversion potential from landfill and combustion?: High/Medium/Low	(4) **Receptivity** - What is the relative ease and level of effort to initiate and obtain local buy-in for the measure? For example, does it involve promotional activities, recognition, no requirements on waste generators, minor costs (generally easier), or does it involve setting mandatory requirements, restrictions, or higher costs (generally more difficult)?: Easy/Medium/Difficult
(2) **Upstream Impacts** - How significantly does the measure reduce upstream climate impacts (greenhouse gas emissions generated by raw materials extraction and product manufacturing)?: High/Medium/Low	(5) **Staff Knowledge** - How much staff knowledge or specific expertise is needed to implement the measure? Can it be implemented by mid-level local agency staff without outside legal or contractor assistance? Low/Medium/High
(3) **Local Authority** - How much control must the local government exert over the discard management system (e.g., service providers, infrastructure collection/transfer/disposal, and/or waste generators) in order to accomplish the measure? Low (Implied – indirectly through culture or practice) Medium (Influenced – by policy, permit, license or ordinance) High (Explicit - directly through contracts or operations)	(6) **Community Led Initiatives** - How easy or hard is it for individuals or groups to initiate adoption or implementation of the measure without actions required by the jurisdiction? Can a local non-profit or group of interested residents carry out the activity (e.g., develop a "how-to guide") or will it require initiation by local jurisdiction staff or elected bodies (e.g., adopt a local ordinance)? Easy/Medium/Difficult

D. KINGSTON, NY, CASE STUDY

Appendix H. Case Studies in this Study's Appendices reviews the below listed topics, with the exception of Applicable Food Waste Laws, for the 11 local governments researched. Kingston's case study is provided here for reference against the approached taken by the local government case studies.

The City of Kingston in New York, population 24,069, is located between New York City and Albany in the Hudson River Valley region. The City's DPW picks up the refuse and recycling curbside for free for most City residents except those in large multi-family buildings and it also services many small businesses in the City. Refuse is picked up weekly, with dual stream recycling picked up every other week, starting in 2019. One week is dedicated to picking up glass, plastic, and metal recycling in a city-provided blue tote with a blue lid, while on the other week paper is picked up in a city-provided blue tote with a yellow lid. Private haulers cover the large multi-families and larger businesses. Private haulers must be permitted by the City to operate within City limits.

D.1. APPLICABLE FOOD WASTE LAWS

There are two recent laws that may regulate food waste generators in Kingston: Ulster County's food waste law and New York State's food waste law.

In 2019 Ulster County passed the Food Waste Prevention and Recovery Act requiring large generators to separate food waste from general waste and arrange for its reuse, compost it onsite, or deliver it to a facility that would compost or use it in an anaerobic digester. The law first applies to generators producing 2 tons of food waste per week in 2021 and then subsequently increases coverage incrementally to producers of 0.5 tons of food waste by July 2024. There are waivers available for generators with gross income under $300,000, or if the total cost of solid waste management, including organics recycling, is more than 10% greater than the cost without organics recycling. Waivers are valid for one year and require participation in training to achieve compliance. [325/326]

The Ulster law aligns with New York State's Food Donation and Food Scraps Recycling Law, also passed in 2019, which went into effect in 2022. The state law requires businesses and institutions that generate an annual average of two tons of wasted food per week to donate and recycle all remaining food scraps, as long as they are within 25 miles of an organics recycler. The state law does not have a decreasing target like Ulster's law. The State law does not cover New York City, which has its own law detailed in the New York City case study, hospitals, nursing homes, adult care facilities, K-12 schools, or farms. The Department of Environmental Conservation publishes a list of businesses that fit under the law in June each year and by January, they will have to comply with the requirements. There are waivers that can be submitted by October for the following year and businesses that comply will need to submit an annual report by March of the next year.[327]

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[325] "Food Waste Prevention and Recovery Act", Ulster County Department of the Environment, https://ulstercountyny.gov/environment/food-waste-prevention-and-recovery-act. Accessed January 20, 2022.

[326] "304-52 Notification, Training, and Education", Ulster County, NY Municipal Code, https://ecode360.com/36635614. Accessed January 20, 2022.

[327] "Food Donation and Food Scraps Recycling Law", NYS DEC, https://www.dec.ny.gov/chemical/114499.html. Accessed January 20, 2022.

D.2. ORDINANCE LANGUAGE REGARDING ORGANICS DIVERSION

Kingston currently does not have an ordinance referencing organics diversion.

D.3. FEES

There are no fees for refuse and recycling curbside collection in the City of Kingston. The City's fee schedule has approximately one page of fees related to refuse, including some fines for additional services beyond regular curbside pickup, including excessive refuse, bulk refuse pickup, furniture, tires, and appliances. Some of these services are only for drop-off at the transfer station. Residents can also get a permit to leave furniture and white goods by the curb.[328]

D.4. FINES FOR NON-COMPLIANCE

The City's fee schedule mentions fines for recycling non-compliance. The first incident is a $25 fine, the second is a $50 fine, and third and additional incidences are $100.[329]

D.5. EVENTS

Kingston has a special use permit that event holders must fill out for road or sidewalk closures, vendor permits, refuse removal and other city services, and noise permits. There is a $25 application fee. The permit notes that the City will remove refuse and recycling at a cost of $20 per tote. The event is responsible for cleaning up refuse and recycling is required.[330]

D.6. BUSINESSES

Businesses are serviced either by the City DPW or by private haulers licensed by the City. If they are serviced by the City, they are subject to the same fees and fines for non-compliance as residents. If they are serviced by a private hauler, the City does not have regulations for them currently except to say, "In the event of a private contract rather than a municipal operation, the Superintendent is hereby empowered to supervise the proper performance of the contract as the interests of the City of Kingston may appear to require."[331]

D.7. EDUCATIONAL & OUTREACH MATERIALS

Kingston does not provide composting educational materials as it is not a City service currently. However, they have a robust recycling outreach program, including multiple webpages that are updated seasonally.[332/333]

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[328] "2022 City of Kingston Fee Schedule", City of Kingston, https://www.kingston-ny.gov/filestorage/8399/22301/22340/2022_Adopted_Fee_Schedule_DPW_section.pdf. Accessed March 13, 2023.

[329] "2022 City of Kingston Fee Schedule", City of Kingston.

[330] "Special Events in Kingston", Kingston, NY, https://www.kingston-ny.gov/specialevents. Accessed January 20, 2022.

[331] "350-11 Frequency, Type, and Conditions of Collection", Kingston, NY Municipal Code, https://ecode360.com/6725421. Accessed January 20, 2022.

[332] "Sustainable Resource Management", City of Kingston,https://kingston-ny.gov/content/8399/22301/22340/default.aspx. Accessed January 20, 2022.

[333] "Kingston Recycles", City of Kingston, https://kingston-ny.gov/Recycle. Accessed January 20, 2022.

2. ORGANICS DIVERSION AT EVENTS

Event producers that are required to, or simply wish to, provide organics collection at their events have proven best practices and numerous resources available to assist them. A selection of these resources has been analyzed in this literature review with the goal of helping the City of Kingston prepare for a City-wide mandate of organics collection, including at events. Specific recommendations related to events are provided in this Study in "Recommendations from Events Waste Estimates".

Highlights identified in the best practices for events include:

- Creating a detailed plan well ahead of the event for how waste will be handled and separated, as well as what happens to it after the event;
- Ensuring volunteers, vendors, and event staff are adequately trained on how to handle waste;
- Providing clear and educational signage for attendees and if possible, making sure each waste station has a volunteer to help educate event attendees about what goes where; and
- Communicating the goals of the event related to waste to all potential attendees ahead of the event and during the event, as well as evaluating the results after the event.

A. BEST PRACTICES FOR LOCAL GOVERNMENTS

Two resources describing how municipalities manage organics collection at events were reviewed and their findings are described here. Neither was particularly in-depth, so event organics collection best practices from three of the municipal case studies were reviewed and are detailed later in this section. As described in the Best Practices for Local Government Solid Waste Recycling, Diversion from Landfill and Waste Reduction December 2011 Prepared by Mecklenburg County Land Use & Environmental Services Agency, Solid Waste Division[334] "Event recycling programs are practiced by many of the local government's examined in this study. Event recycling, while not yielding a large amount of waste diversion, reinforces a recycling ethic and provides a way to recycle while away from home or business where recycling containers may be available. Some communities have created policies that address our "throw-away" society and require event vendors to use recyclable or compostable food and beverage containers that have been approved by the local government. Some require event organizers to submit a recycling plan, others provide recycling containers and services."[335]

The US EPA provides a web-based tool, Managing and Transforming Waste Streams: A Tool for Communities.[336] The tool enables local planners to explore various policies and programs, and provides implementation examples from hundreds of communities across the United States. The tool recommends policies related to event waste management, including, a policy for Zero Waste Public Venues & Events where communities adopt and implement Zero Waste goals and action plans for all public venues and events. They would provide training, displays, and signs and technical assistance to

[334] "Best Practices for Local Government Solid Waste Recycling, Diversion from Landfill and Waste Reduction", Mecklenburg County Land Use & Environmental Services Agency, Solid Waste Division, December 2011.
https://studylib.net/doc/13306108/%C2%A0-best%C2%A0practices%C2%A0for%C2%A0local%C2%A0government%C2%A0solid%C2%A0-waste%C2%A0recycl.

[335] "Best Practices for Local Government Solid Waste Recycling, Diversion from Landfill and Waste Reduction", Mecklenburg County.

[336] "Examples and Resources for Transforming Waste Streams in Communities (#1-50)", US EPA, https://www.epa.gov/transforming-waste-tool/managing-and-transforming-waste-streams-tool.

venue and event coordinators. An example is from San Francisco, CA:[337] "Every event held in San Francisco is required to offer recycling and composting at the event. The City offers special assistance and customizable event signs to help event operators comply with the Mandatory Composting and Recycling Ordinance".[338] The tool also recommends a policy around Zero Waste Private Venues & Events in which communities promote setting of zero waste goals to owners/operators of private venues, e.g., sports stadiums, hotel conferences. The communities would provide training and technical assistance to event coordinators for implementation of zero waste action plans. The example given is from Atlanta, GA: "Atlanta Recycles, a coalition of government, corporate, and environmental entities, implemented a "Zero Waste Zones" initiative to eliminate practically all of the waste currently going to landfills from large convention and hotel facilities in Atlanta's downtown convention district."[339]

B. GUIDES FOR EVENT PRODUCERS

Three guides/reports created with the main audience as event producers were reviewed. The most detailed report reviewed is "Guidance for Special Event Food Waste Diversion" from the Northeast Recycling Council (NERC).[340] At over 100 pages total, the report gives event producers specific actionable advice on every topic they could consider related to composting at events, including template surveys, timelines, plans, and more.

Franklin County, MA's Solid Waste District's Special Events Waste Reduction Guide[341] was also reviewed as well as Louisville Metro's Solid Waste Management Services Division's Special Event Recycling and Waste Reduction Best Practices guide.[342] The Louisville guide is part of the City's goal to reduce waste to landfill 90% by 2042. Large events with 500 or more attendees must develop a recycling and waste reduction plan as part of their event application process. The plan must include: a site map of the festival or event area, showing the location and size of garbage and recycling collection dumpsters, a disposal location list, and the names and contact details of individuals or groups responsible for managing garbage and recycling services during and after the festival or event. The Louisville guide does not specifically touch on composting, but much of the advice for reducing waste and improving recycling rates applies to composting.

The areas where the three guides overlap are detailed below under five sections roughly taken from the NERC guide: Planning, Implementing the Plan, Collecting, Communication, and Evaluation. In

[337] "Event Recycling and Composting", San Francisco Department of the Environment, https://sfenvironment.org/event-recycling-and-composting. Accessed December 27, 2021.

[338] "Examples and Resources for Transforming Waste Streams in Communities (#11)", US EPA, https://www.epa.gov/transforming-waste-tool/examples-and-resources-transforming-waste-streams-communities-1-50#11. Accessed December 27, 2021.

[339] "Examples and Resources for Transforming Waste Streams in Communities (#32)", US EPA, https://www.epa.gov/transforming-waste-tool/examples-and-resources-transforming-waste-streams-communities-1-50#32. Accessed December 27, 2021.

[340] Athena Lee Bradley, "Guidance for Special Event Food Waste Diversion", North East Recycling Coalition, https://nerc.org/documents/guidance_for_special_event_food_waste_diversion.pdf, August 2010.

[341] Franklin County Waste District, "Special Events Waste Reduction Guide," http://www.franklincountywastedistrict.org/EventsRecyclingGuidefinal.pdf, June 2006. Accessed December 27, 2021.

[342] "Special Event Recycling and Waste Reduction Best Practice Guide", Louisville Metro's Solid Waste Management Services Division.

addition to the best practices that overlap all three guides, this section details specific best practices from NERC's guide chosen for applicability to Kingston, and any additional helpful details or practices highlighted in the other two guides.

B.1. PLANNING

All three waste reduction guides focus on the importance of planning. Each recommends having a recycling/composting/waste coordinator and/or committee for the event. They also emphasize the importance of identifying the materials to be collected, deciding where the material will go and how it will get there, what containers to use to collect the material, and the location and set up of each container well in advance of the event.

As the NERC plan notes, "planning is crucial for success in diverting food scraps from the special event waste stream…events are fast paced and hectic. Adding an additional activity and one that may be unfamiliar to many organizers could meet with resistance."[343] For that reason, the plan recommends starting early to get buy-in from all stakeholders and educating them on best practices. The next step is identifying materials to collect and estimating volumes. The plan gives a survey for vendors to estimate this and a suggested timeline and checklist in the appendix.[344]

Once the event producer understands the volume and materials to be collected, next comes the decision about where the compostable material will go and how the material will get to the processing location. The recommendations include verifying the materials acceptable to the processing operation (particularly important is understanding whether the producer accepts compostable bin liners and if so, whether the event will utilize those), the types of containers acceptable for collection, as well as logistics related to hauling services, contamination, cost, etc. The report emphasizes the importance of working closely with the hauler and compost processing facility to ensure that the logistics of how the compost will be collected at the end of the event go smoothly.

B.2. FOOD WASTE MANAGEMENT PLAN IMPLEMENTATION

In the NERC report, the next step is implementing the food waste management plan, including notifying vendors, perhaps mandating composting as part of their contract, and outlining their responsibilities.[345] Each of the three plans notes the importance of working closely with vendors and all suggest mandating the waste diversion as a vendor requirement.

The NERC report also recommends a pilot to test out the organics collection. Additional strategies related to implementing the plan include asking or requiring vendors to use compostable service ware, providing compost collection containers for the kitchen areas, arranging for collection of unserved non-perishable food and other usable items by food banks, soup kitchens, or shelters, and dispensing drinks "on-tap" with souvenir reusable cups. Other recommendations include requiring organizers to haul away their own refuse to encourage vendors to increase waste diversion through composting and recycling at the event, recognizing vendors who participate correctly, and monitoring compliance throughout the event.

[343] Athena Lee Bradley, "Guidance for Special Event Food Waste Diversion", p. 5.

[344] Athena Lee Bradley, "Guidance for Special Event Food Waste Diversion", p. 25.

[345] Athena Lee Bradley, "Guidance for Special Event Food Waste Diversion", p. 9.

B.3. COLLECTING FOOD WASTE

1. SIGNAGE AND LOCATION

The importance of adequate signage is explained in each of the guides reviewed here. As the NERC report says, "Many attendees will be unfamiliar with what is compostable. Compostable plastics will be especially confusing to most people. Proper signage will help educate attendees about what is compostable and what is not, as well as help to ensure the proper separation of materials. Signage should be placed both at bin stations and on the collection bins themselves."[346]

The NERC report specifically mentions the importance of the prominence of banners or flags, placed high enough to be seen from a distance, in addition to signage next to collection containers at eye level so attendees can easily see them. A local example of effective signage for organics at events is the practice of former company Zero to Go, which provided private food scrap drop off and collection service in the City of Beacon for paying customers and also handled the waste management for many Mid-Hudson events. Pictures of their signage are below. As seen in Figure 73 in the picture on the right, the signs pointing attendees to the waste station are clear and concise. As seen in the picture on the left, they do not provide a comprehensive list or sign of exactly what can be put in each bin, but that is because their model included having people posted at each waste station to assist in sorting before disposal.

Figure 73. Left: Waste station at Zero To Go event from a Clearwater Festival event. Right: Example of Zero To Go signage directing attendees to waste station.

The NERC report suggests that events could solicit sponsors for signage, and both the NERC report and the Franklin County guide suggest placing photos or samples of vendor packaging and service ware on bins.

The NERC report also suggests that event producers consider a two bin (compost and recycling) station system for a true Zero-waste event if the event will not have any non-recyclable or compostable service ware and attendees will not be bringing their own materials in. It does say that there should be refuse bins only near toilets and special buckets can be used for cigarettes and gum. They also suggest having a baby changing area or table near portable toilets with a designated container for diapers. Otherwise, they recommend using a three-bin system with refuse, recycling and compost options.

[346]Athena Lee Bradley, "Guidance for Special Event Food Waste Diversion", p. 11.

Louisville's report adds that, "Restricted openings and pictures of recyclable materials also help differentiate recycling containers. Your recycling bins should be consistent in visual appearance throughout the event space to make them easily identifiable."[347] The report also recommends that event producers "Mark garbage containers as 'Landfill bound' or 'Landfill only'. Language can draw strong conclusions that can impact decision making."[348] It also recommends using transparent plastic bags as liners for recycling to easily identify and remove garbage that ends up in recycling bins and to avoid lids that must be opened to deposit waste.

The NERC report suggests noting waste stations on a map of the event. Franklin County's guide joins the NERC guide to recommend always placing compost collection containers next to recycling and refuse cans.[349] The overall goal should be to make sure stations are convenient and visible.

2. STAFFING AND BIN MONITORING

All three reports recommend having a staff member or volunteer monitor each bin station if possible. The NERC report suggests limiting compost collection to food vendor areas if there are not enough staff to monitor each station, or assigning a floater to monitor bins in less frequented areas.[350] If compostable liners will be used, full bags will need to be removed, replaced with new bags, and transported to service area. If not, smaller containers can be emptied into a larger container or cart for transport to service area. Or full carts can be swapped for empty ones.

The NERC report suggests numerous ways for event producers to work with vendors to accommodate their own food waste. Importantly, they suggest assigning a staff member or volunteer to assist vendors in composting.

Overall, all reports note that staff and volunteers are essential to ensuring there is not significant contamination. They should be knowledgeable about compost and willing to speak up when they see attendees or vendors contaminating bins. The bin monitors should be required to pick out contaminants from bins – a messy job that may not appeal to everyone. If seeking volunteers, the NERC report suggests asking local environmental groups or college students needing environmental studies extra credit to volunteer. The Franklin County report adds scout groups, youth groups or church groups as other options for soliciting help. Ideally every station will have a volunteer. As the Franklin report reminds readers, "It is a lot easier to have a volunteer stand at each recycling/compost station during the event than it is to have to sort out refuse from the collected recyclables and compost after the event."[351]

All guides mention best practices for cleaning up after the event, including having staff or volunteers assigned to specific areas and ensuring compostable materials are moved to a specific location where the hauler will collect them. The NERC report recommends working closely with vendors at this point,

[347] "Special Event Recycling and Waste Reduction Best Practice Guide", Louisville Metro's Solid Waste Management Services Division, p. 7.

[348] "Special Event Recycling and Waste Reduction Best Practice Guide", Louisville Metro's Solid Waste Management Services Division, p. 7.

[349] "Special Events Waste Reduction Guide", Franklin County Waste District, p. 8.

[350] Athena Lee Bradley, "Guidance for Special Event Food Waste Diversion", p. 19.

[351] "Special Events Waste Reduction Guide", Franklin County Waste District, p. 11.

since they often want to pack up and leave quickly, to ensure they continue to compost and recycle effectively during clean up. The report also suggests spending some time during clean up tracking the amount of refuse, recycling, and compost to compare the volume of each generated. The Franklin County report notes that event producers should make sure compostable materials are secure against animal intrusion. Particularly if the event lasts more than one day, materials should be secured in a building or dumpster.

3. COMMUNICATION

All guides make clear the importance of communication with various stakeholders, including vendors, volunteers and staff, as well as media and the public.

The NERC report suggests identifying requirements that will apply to vendors, providing information in vendor packets, making collection of compostable items part of the application to be a vendor, meeting with each vendor prior to the event, monitoring compliance throughout the event, and determining in advance how to deal with vendors that do not comply.

The report also states that staff and volunteer training is critical, not just for those managing bins, but everyone working at the event should know what can be composted and recycled and where the stations are located. On the day of the event, the composting coordinator or team should review logistics with everyone and help them understand their role managing stations, and practicing safety. Both the Franklin report and the NERC report specify that no one with a bee allergy should be working at a bin station and they should always wear gloves and use caution when lifting.

As for the public, the NERC report suggests distributing press releases and announcements about the food waste diversion to media outlets, including information about composting in event brochures, fliers, etc.; and to make sure and share successes with the public after the event.

4. EVALUATION

The NERC report is the only one of the three with a robust section about evaluating the composting effort after the event.[352] The report suggests working with the hauler or collector to weigh or estimate amounts diverted through composting, asking the processor if there were problems with contamination, taking photos of composting, signage, etc. for future reference, asking vendors, volunteers, and attendees for comments about the effort, determining the amount of waste generated to calculate the composting and recycling rates, and finally using that data to determine GHG emissions reductions from composting and recycling.

[352] Lee Bradley, Athena, "Guidance for Special Event Food Waste Diversion." p.23

B.4. KINGSTON CONSIDERATIONS

Many of the best practices identified in these reports are specifically for event producers to implement, but municipalities and other governmental agencies issuing event permits have a role to play in ensuring these best practices are acted upon by event producers. As detailed in the highlights from the best practices municipal case studies, the communities that mandate organics diversion for residences and businesses also mandate organics diversion at events. While the case studies provide an overview of how each of the case study municipalities handles events, further analysis was done on the events best practices established by three communities: Portland, San Francisco, and Seattle.

Figure 74. The Portland Events recycling webpage shows the type of equipment the City would rent to event producers prior to March 2020. It now directs them to purchase the equipment themselves.

1. PORTLAND, OR

Portland provides significant assistance to event producers to assist them in recycling at events. There is no mention of organics collection at events on their website, but there is an Event Recycling webpage, see Figure 74, that includes step by step instructions for how to effectively recycle at events, printable signs, and before March 2020, the Bureau of Planning and Sustainability offered recycling assistance and equipment rental.[353]

The only mention of event organics collection is to remind event producers to "Remember that ALL disposable dishware, cutlery, and napkins go in the garbage, regardless of what they're made of, or whether they have a label that says "recyclable, "biodegradable," or "compostable."" Because of Portland's strict composting rules that do not allow any compostable plastics, no BPI-certified cutlery or dishware is acceptable.

2. SAN FRANCISCO, CA

San Francisco has the most robust program to assist event producers in their organics collection efforts, managed by an agency of the City, SF Environment. This is reflected in their multiple webpages[354] (see Figure 75) specifically for event producers. Event producers must recycle and compost. To comply with the requirement, they must submit a Zero Waste Event Plan[355] as well as complete an event application 30 days prior to the event with proof of recycling, compost, and refuse collection services, or a letter from the SF Environment registered "Event Greener", consultants who help event producers and are registered with the City, to the permitting agency.

[353] "Event Recycling", Portland.gov, https://www.portland.gov/bps/garbage-recycling/get-started. Accessed December 27, 2021.

[354] "Zero Waste Resources for Event Producers", sfenvironment.org, October 15, 2011, https://sfenvironment.org/recycling-composting-resources-event-producers.

[355] "Event Recycling & Composting", sfenvironment.org, May 2, 2018, https://sfenvironment.org/event-recycling-and-composting.

SF environment gives a Zero Waste Event checklist[356] to communities that includes the above steps as well as setting up zero waste bin stations, hiring an SF Environment-registered Event Greener, details on what requirements there are for foodware, hydration stations, reusables, and working with food vendors. In addition, event producers must attend a free zero waste event training hosted by SF Environment[357], which are held monthly. They must do this before ordering refuse service for their event, so must plan well in advance. The training is required for any event producer applying for permits through any San Francisco Agency.

"Concepts covered include:

- Mandatory Composting and Recycling requirements
- Event food ware, packaged water, and hydration stations
- Recology event services and debris box rentals
- Separation compliance (Sorting and contamination protocols)
- Event greening services
- Food waste reduction and food recovery at events
- Discussion on single-use and reusable foodware at events
- Implementation of the 10% reusable cup requirement (Effective 2020)
- Zero Waste Resources for Event Producers
- Implications of a failed event refuse audit:
    - **Removal of Diversion Discount (Recovery Discount)**: The recovery discount is a cost reduction based on an event's recycling and composting rate. In instances of excessive contamination, the recovery discount will be revoked.
    - **Contamination Charge up to 100%:** Events are subject to a contamination charge of up to 100% for each contaminated stream.
    - **Submittal Zero Waste Event Plan:** The Zero Waste Event Plan[358] is a worksheet outlining a corrective course of action. The Plan must be submitted to sfevents@recology.com at least 7 days in advance of the event producer's next event. You can access the Zero Waste Plan here."[359/360]

SF Environment also offers free consultations for event producers on how to reduce costs and have a successful zero waste event as well as access to a sign maker program for event signage design.[361]

[356] "Zero Waste Checklist for Events", sfenvironment.org, September 10, 2013, https://sfenvironment.org/zw-event-checklist.

[357] "Mandatory Zero Waste Event Training", sfenvironment.org, October 15, 2011, https://sfenvironment.org/article/event-recycling-and-composting/sf-zero-waste-event-workshop-certification.

[358] "SFE Zero Waste Event Plan", SF Environment, https://sfenvironment.org/download/sfe-zero-waste-event-plan. Accessed December 27, 2021.

[359] "Zero Waste Resources for Event Producers", SF Environment, https://sfenvironment.org/recycling-composting-resources-event-producers. Accessed December 27, 2021.

[360] "Mandatory Zero Waste Event Training", SF Environment.

[361] "San Francisco Recycles | What Goes Where", SF Environment, https://sfrecycles.org/signmaker. Accessed December 27, 2021.

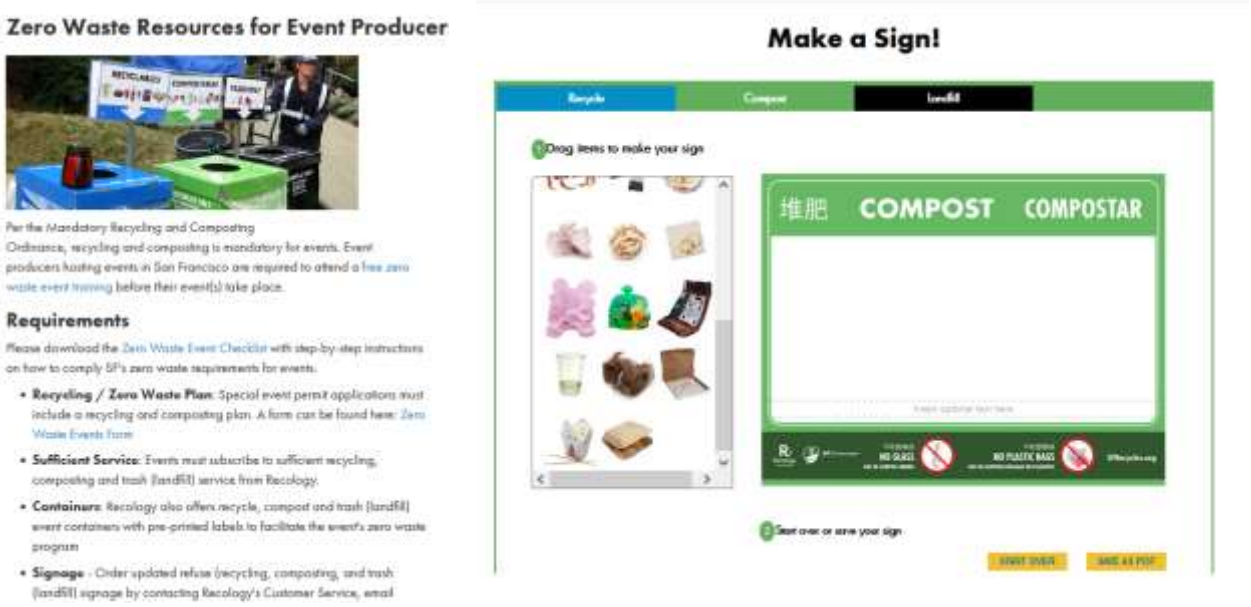

Figure 75. Left: San Francisco's webpage for resources for event producers details the requirements for event producers and more. Right: San Francisco offers a "Sign maker" so event producers can pick and choose the content on their customizable signs.

3. SEATTLE, WA

Seattle has similar laws to San Francisco for event producers to recycle and compost. However, they provide less robust outreach and training than San Francisco. Their webpage for event producers[362] is located under the special events office. The webpage states, "It is required to compost food waste from all food prep areas and plate scrapings from staff areas. All food packaging including compostable plates, bowls, trays and tubs used to serve food must be collected for compost

[362] "RECYCLING / COMPOSTING / TRASH", Special Events Office of Seattle, https://www.seattle.gov/special-events-office/handbook/recycling-composting-and-waste. Accessed March 28, 2023.

collection."[363] There is also a brochure for food vendors at events[364] and one that specifically details the requirements for straws and utensils to be compostable, see Figure 77.[365]

Figure 76. Seattle's brochure for event food vendors.

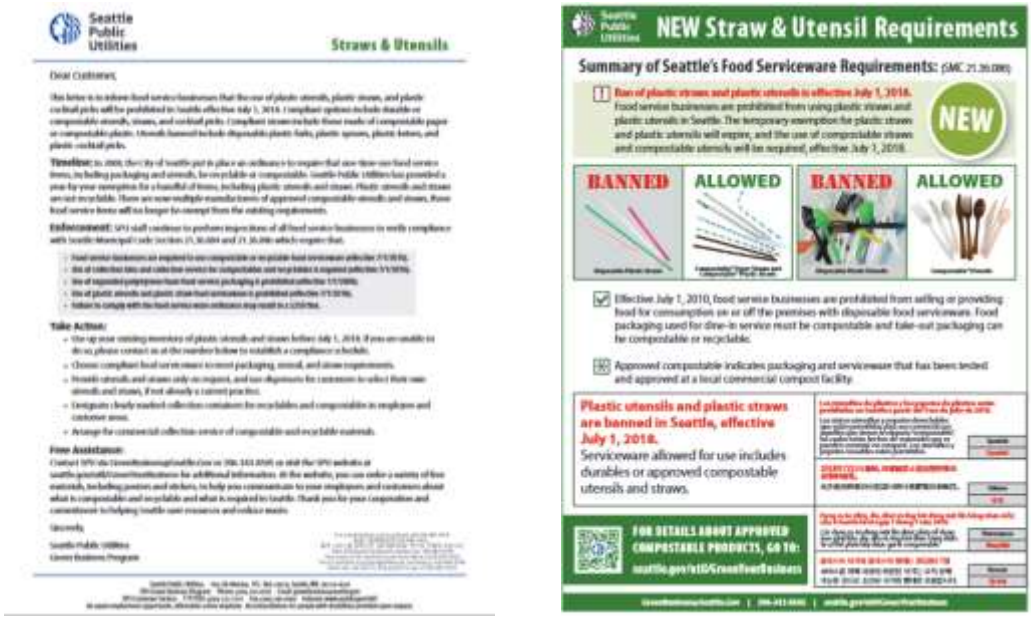

Figure 77. Seattle's brochure detailing the straw and utensil requirements that apply for events.

[363] "RECYCLING / COMPOSTING / TRASH", Special Events Office, City of Seattle.

[364] "Event and Food Vendor Resources", City of Seattle, https://www.seattle.gov/util/cs/groups/public/@spu/@recycle/documents/webcontent/spu01_003798.pdf. Accessed December 27, 2021.

[365] "Straw and Utensil Requirements", City of Seattle, http://www.seattle.gov/util/cs/groups/public/@spu/@foodyard/documents/webcontent/1_072578.pdf. Accessed December 27, 2021.

3. MUNICIPAL APPLICATION OF FINISHED COMPOST

This literature review details the potential ways in which the City of Kingston can utilize the finished compost from a curbside organics diversion program. The review is divided into three sections: Background, describing the ways in which compost is beneficial and its potential uses; Municipal Use, which includes a sample ordinance for using compost and case studies of how governments use compost; and Community Use, showcasing the ways finished compost can be given back to the community as a benefit/incentive of the program.

A. BACKGROUND

There are significant benefits to using compost as a soil amendment. Municipalities implementing food scrap diversion programs where the food scraps are turned into compost may consider these benefits as they decide whether to adjust how the municipal government uses compost for its operations, and whether and how to offer the finished compost to residents of the community as a benefit for their participation in the organics diversion program. This section details the overall benefits of using compost.

The US Composting Council has verified the following benefits of composting through independent research:

> Improves soil structure and porosity, creating a better plant root environment; increases moisture filtration and permeability and reduced bulk density of heavy soils – improving moisture filtration rates and reducing erosion and runoff; improves the moisture holding capacity of light soils reducing water loss and nutrient leaching and improving moisture retention; improves the cation exchange capacity (CEC) of soils; supplies organic matter; aids the proliferation of soil microbes; supplies beneficial microorganisms to soils and growing media; encourages vigorous root growth; allows plants to more effectively utilize nutrients, while reducing nutrient loss by leaching; enables soils to retain nutrients longer; contains humus – assisting in soil aggregation and making nutrients more available for plant uptake; and finally, buffers soil PH.[366]

A guidebook for Compost Operators in Michigan, published by the Michigan Recycling Coalition notes specific uses for compost include,

- mix with existing soil to create a superior topsoil;
- use in all landscape areas for soil improvement - lawn, flower, vegetable gardens, around trees and shrubs;
- bed preparation;
- as seed cover when seeding turf areas;
- backfill mix for planting trees and shrubs;
- to heel in nursery stock during transplanting;
- erosion control;
- seedling establishment;
- frost-heave control for nursery field crops;
- weed control;

[366] Ron Alexander, "AAPFCO Soil Amendment/Compost Uniform Product Claims", US Composting Council, August 2005, p. 1. Note: semicolons added to improve understanding.

- to reclaim disturbed lands;
- landfill final cover;
- plant bed renovation;
- lawn core aeration and overseeding;
- replacement for cover crops;
- topsoil extender;
- to increase percent of organic matter in subsoils; and
- basis for making compost extracts and teas.[367]

The guidebook also notes that more compost is not always better, in fact, excessive compost can result in reduced growth, ground water contamination, and potential surface runoff. Also, they note that, "Plain compost made from yard clippings will not likely contain sufficient nitrogen causing over-succulence, but a compost product supplemented with manure or fertilizer could."[368] Overall, they note that using too much compost is a waste of resources and can jeopardize the crop, but compost applied properly will generally increase rates of success. There are exceptions to this rule, particularly acid-loving plants that may not respond well to the pH of compost. The guidebook also notes that there are long term effects from applying compost to soil. "Nitrogen and other nutrients tied up in compost are released slowly over a number of years."[369]

The Environmental Protection Agency has factsheets describing the ways compost can be useful in circumstances that may apply to municipalities. The factsheet detailing compost's use for erosion control and turf landscaping notes, "On steep embankments along roads and highways, compost can be more effective than traditional hydromulch at reducing erosion and establishing turf because compost forms a thicker, more permanent growth due to its ability to improve the infrastructure of the soil."[370] The factsheet also notes that compost can be used to protect soil from wind erosion and during droughts because of its ability to retain moisture. It details how the Federal Highway Administration worked with the EPA to conduct a demonstration project comparing compost to hydromulch. Results showed, "the areas treated with only compost persevered within 6 months, out-performing the traditional method by establishing a thick, healthy vegetative cover."[371] The factsheet also details how compost can alleviate soil compaction and remediate turf grasses, as compost can suppress plant disease such as snow mold, brown patch, and dollar spot, "After 3 years of using compost as a topdressing, the Country Club of Rochester, New York, has nearly eliminated the need for fungicide applications for such diseases."[372]

The fact sheet explaining how compost can be used for bioremediation and pollution prevention details how compost can help with heavy metal contamination, organic contaminants, and petroleum hydrocarbon contamination. It can also assist with stormwater runoff. As the factsheet notes,

[367] "Michigan Compost Operators Guidebook", Michigan Recycling Coalition, March 2015, pp. 7-14. Note that semicolons added to improve understanding.

[368] "Michigan Compost Operators Guidebook", Michigan Recycling Coalition, pp. 7-15.

[369] "Michigan Compost Operators Guidebook", Michigan Recycling Coalition, pp. 7-15.

[370] "Innovative Uses of Compost: Erosion Control, Turf Remediation, and Landscaping", US EPA, October 1997, p. 2.

[371] "Innovative Uses of Compost: Erosion Control, Turf Remediation, and Landscaping", US EPA, p. 3.

[372] "Innovative Uses of Compost: Erosion Control, Turf Remediation, and Landscaping", US EPA, p. 3.

> Stormwater runoff must be treated before it is discharged into water to meet the U.S. Environmental Protection Agency's National Pollutant Discharge Elimination System regulations. To comply, some municipalities and industries are turning to solutions that involve compost technology instead of more expensive traditional treatment methods, such as vegetated filter strips or grassy swales (phytoremediation) and holding ponds. These traditional methods require much larger tracts of land than methods utilizing compost and are limited in their removal of contaminants. In one industrial area, for example, a traditional holding pond required 3.5 acres and cost $45,000, while a compost stormwater system, designed to handle the same amount of runoff, required only 0.5 acre, required less maintenance, and cost $17,300.[373]

Finally, the factsheet details how compost can remove VOCs that cause odors in the air. "The compost functions as an organic medium containing microorganisms that digest the organic, odor-causing compounds. Industrial facilities have made use of this compost technology to remove VOCs at the 99 percent level."[374]

A webpage from the Illinois Food Scrap Coalition[375] gives directions on best practices for applying compost in different landscapes. For lawns, they recommend first core aerating and then top-dressing with a quarter to half inch layer of compost, then reseed and water at no more than one inch per week. For native landscaping, they recommend spreading one third of an inch of compost before seeding or planting. For raised flower beds, they recommend filling the bed with compost or a blend of compost and topsoil, then planting the flowers and mulching. Finally, for vegetable gardens, they recommend using compost as a soil conditioner in the late fall or early spring before planting by adding one half of an inch to three inches to the garden bed, then incorporating the compost into the top four inches of soil.

The Coalition, in a factsheet created with the organization Midwest Goes Green, also recommends tools to help spread compost as, "standard landscape material spreaders usually cannot handle and spread compost due to its higher moisture content compared to granular fertilizers, sand or seed."[376] They note that small-scale compost top-dressing projects can be completed by hand with wheelbarrows and shovels, but larger projects require specialized compost spreading equipment. Table 63. Sample Compost Spreaders shows a selection of options available.

[373] "Innovative Uses of Compost: Bioremediation and Pollution Prevention", US EPA, October 1997, p. 3

[374] "Innovative Uses of Compost: Bioremediation and Pollution Prevention", US EPA, October 1997, p. 4

[375] "Using Compost", 2019 Illinois Food Scrap Coalition. https://illinoiscomposts.org/using-compost/. Accessed January 11, 2021.

[376] "Using Compost", Illinois Food Scrap Coalition and Midwest Goes Green.

Table 63. Sample Compost Spreaders

Spreader Type	Project Type	Image
Roller Spreader: Originally designed for peat moss, the roller spreader has openings large enough to allow compost to pass through.	Small projects such as home lawns.	
Push Machine Applicator: This walk behind spreader has a small conveyor and spinner discs to effectively meter out composts of varying moisture contents.	Good for contractors, available for rent. Preferable for larger projects such as a sports field.	
Tow behind: A tow behind unit with a conveyor belt can drop material in a precise path. Units outfitted with spinner discs results in a wider application path.	Large projects or spaces where frequent application at high volume is necessary.	
Blower Truck: The blower truck operator has a remote on belt to control volume of compost moving through the hose.	Good for contractors to use on home lawns	

B. RECOMMENDATIONS ON MUNICIPAL APPLICATION OF FINISHED COMPOST

- **Utilize compost more regularly for its municipal operations.** As described in "Background", there are significant benefits for utilizing compost in landscaping activities, including the types of landscaping activities that municipalities engage in. The following is a representative list of potential compost uses within the City's municipal operations:
    - as cover on bioswales on Broadway, Kingston Point, Uptown parking lots, and Midtown parking lots;
    - as seed cover when seeding park lawns and ball fields;
    - backfill mix for planting new street and park trees and shrubs; and
    - in landscaped areas at City Hall, the Police Department, Dietz Stadium, landscaped parks, and other landscaped facilities.
- **Implement an ordinance to mandate the use of compost for its operations.** NRDC's sample legislation, described in Municipal Use, is an example that prioritizes compost usage for

municipal public works operations while also not placing an undue economic burden on the municipality. The City should research and secure a source for reasonably priced compost before implementing such a policy.

- **Offer compost giveback to residents as a way for the community to see the results of their organics diversion**. This giveback, detailed further in Community Use, could be formulated as either regularly available year-round or seasonally available at the transfer station or hosting a few days a year as giveback events. The best format most likely depends on the location of the compost processing facility. If the processing is contracted out, givebacks hosted as events may make more sense than constantly having compost available to residents.
- **Write into the vendor contract a set amount of compost to be returned to the City.** If Kingston pursues contracting out of organics processing, Kingston may wish to consider including a compost return clause into the vendor contract to enable the above three actions to take place.

C. MUNICIPAL USE

Communities like Kingston that wish to divert organics from their waste stream may also consider adjusting how they utilize compost in their operations. The Natural Resources Defense Council (NRDC) has created a model compost procurement policy to encourage more usage of compost; it is designed to be readily adoptable by local governments. They describe the reasons why a municipality would be interested in supporting the compost industry, noting that a compost procurement policy can, "yield a multitude of economic benefits, including increased compost sales for local suppliers; development of new compost processing businesses, which in turn strengthens and diversifies organic waste recycling infrastructure; and reduced irrigation and fertilizer costs as a result of greater soil nutrient and water retention."[377] They go on to note that such policies are also beneficial because they can reduce GHG emissions, improve soil quality, prevent erosion and reduce stormwater runoff.

NRDC's policy, "requires municipalities to purchase finished compost products when appropriate for use in public projects such as landscaping, construction, and stormwater management—provided it is not cost-prohibitive to acquire."[378] There are examples of governments passing similar policies. Washington State has passed a compost procurement law that ensures compost created from organics diversion programs is used in governmental projects. It also encourages cities with organics diversion programs to enter into compost buy-back agreements with their processors. It gives the following exceptions to the law, "Compost products are not available within a reasonable amount of time; Compost products that are available do not meet existing purchasing standards or federal or state health and safety standards; or compost purchase prices are not reasonable or competitive."[379] Both the NRDC and Washington State policies provide a way for the municipality to increase use of compost without negative economic impacts.

[377] Darby Hoover, "New Model Policy Bolsters Compost Use and Infrastructure", NRDC, August 31, 2021, https://www.nrdc.org/experts/darby-hoover/new-model-policy-bolsters-compost-use-and-infrastructure.

[378] Darby Hoover, "New Model Policy Bolsters Compost Use and Infrastructure".

[379] Karen Dawson, "Washington State's Compost Procurement Law", Biocycle, July 7, 2020, https://www.biocycle.net/washington-states-compost-procurement-law/.

In addition to the potential for a compost procurement policy, the US Composting Council provides case studies of how State Departments of Transportation have utilized compost. While State Departments of Transportation and municipal Departments of Public Works are different, these can provide some sound advice for how municipalities may choose to use compost beneficially.

For instance, the Connecticut Department of Transportation used compost for roadside plantings and conducted a study with a control plot using regular topsoil. They found, "none of the plants planted with compost needed replacement (i.e., the mortality rate was zero percent), compared to a mortality rate of approximately 40% in the standard ConnDOT control plants."[380]

Additionally, in Florida, the Department of Transportation used compost for roadside planting and studied the results with a control plot as well. They found that, "one year after compost was incorporated and seed planted on the road shoulder, vegetative cover remained greater for all plots that received compost than for those which had not."[381] Similarly positive results were found in projects by Departments of Transportation across the country, including Washington, Texas, Idaho, and Virginia. These case studies make clear that compost has significant potential for the operations of municipalities, including improving results of planting projects.

D. COMMUNITY USE

Finally, municipalities that have organics diversion programs sometimes include a way for the community members to receive finished compost in return, either for free or for a reasonable price. Kingston can consider this as a useful way for residents to understand the outcome of their diversion actions and could potentially help increase participation and reduce contamination.

Locally, UCRRA, the County Solid Waste Agency, sells compost for $30/ton that it produces on site at its facility in Kingston with a $20 minimum fee.[382]

Iowa City residents can purchase compost from the Recycling Center. Their website notes, "Iowa City Community Compost, made from local yard and food waste, is sold in large or small quantities. When available, the compost costs $20 per ton with a $2 minimum. Landfill staff can load your truck or trailer with an endloader. For smaller amounts, bring a container and a shovel to self-load."[383] Longmont, Colorado, another City used as a case study, contracts with a private hauler and residents can purchase compost from that hauler. Their website directs residents to contact the hauler for more details.[384]

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[380] Ron Alexander, "Compost Use on State Highway Applications", Composting Council Research and Education Foundation, in conjunction with the United States Composting Council, p. 7, https://cdn.ymaws.com/www.compostingcouncil.org/resource/resmgr/documents/compost_use/Compost_Use_for_DOT.pdf. Accessed January 11, 2022.

[381] Ron Alexander, "Compost Use on State Highway Applications", p. 11.

[382] "Compost for Sale", UCRRA, https://ucrra.org/compost-for-sale/. Accessed January 11, 2022.

[383] "Iowa City Landfill and Recycling Center", Iowa City, IA, https://www.icgov.org/city-government/departments-and-divisions/landfill-and-recycling-center. Accessed January 11, 2022.

[384] "FAQs - Trash, Recycling & Composting", Longmont, CO, https://www.longmontcolorado.gov/departments/departments-n-z/trash-and-recycling/faqs. Accessed January 11, 2022.

Larger cities like New York City, Seattle, and San Francisco also have compost giveback programs. San Francisco lists a few locations where residents can usually get free or low-cost compost;[385] New York City works with composting partners to host a giveback week;[386] Seattle hosts compost giveaway events regularly;[387] and the Village of Scarsdale in Westchester County hosts giveback days.[388]

4. ORGANICS DIVERSION FROM COMMERCIAL FOOD BUSINESSES

An estimated 40% of food waste occurs at restaurants, retail, and commercial food establishments. This averages out to 11.4 million tons of food waste annually in the US, the full cost of which is more than $25 billion.[389] A literature review identified best practices for diverting organics from commercial food businesses, with a focus on restaurants. This section outlines best practices for commercial food establishments on food waste reduction and diversion for both back-of-house and front-of-house, donating edible food, and in-house vs. off-site composting.

A. SOURCES

Among those resources reviewed in guidance of organics diversion from commercial businesses were New York State and Ulster County regulations and guidance – the New York Food Donation and Food Scraps Recycling Law[390] and the Ulster County Food Waste Prevention and Recovery Act,[391] as well as the New York State Food Donation and Food Scraps Recycling Guidance for Businesses[392] document. Particular attention was paid to guidance from the NYS P2I resources, including the webinar "Effective Steps to Launch a Food Scraps Diversion Program for Businesses",[393] the NYSP2I Food Waste Self-Assessment Tool,[394] and two existing resources on legal liability for food donation[395] in New York State from NYS DEC and NYS P2I. Additional resources consulted include the ReFED Restaurant Food Waste Action Guide[396] and the ReFED Foodservice Food Waste Action Guide.[397] For the section,

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[385] "Where can I find free or low-cost compost in San Francisco?", San Francisco, CA, https://sfenvironment.org/compost-in-sf. Accessed January 11, 2022.

[386] "June Compost Giveback", GrowNYC Blog, June 10, 2021, https://www.grownyc.org/blog/tags/compost

[387] "Beyond the Cart", City of Seattle, https://www.seattle.gov/utilities/your-services/collection-and-disposal/recycling/beyond-the-cart. Accessed January 11, 2022.

[388] Conversation with Sanitation Dept.

[389] ReFED, A Roadmap to Reduce U.S. Food Waste by 20 Percent, Solutions Impact Model, unpublished.

[390] "New York Food Donation and Food Scraps Recycling Law", NY State Senate, https://www.nysenate.gov/legislation/laws/ENV/A27T22. Accessed February 13, 2022.

[391] "Food Waste Prevention and Recovery Act", Ulster County, https://ulstercountyny.gov/environment/food-waste-prevention-and-recovery-act. Accessed November 23, 2021.

[392] "New York State Food Donation and Food Scraps Recycling Guidance for New York State Businesses", NYS DEC, 2021, https://www.dec.ny.gov/docs/materials_minerals_pdf/excessfoodbusinesshandbook.pdf.

[393] Livestorm, "Effective Steps to Launch a Food Scraps Diversion Program for Businesses", RIT New York State Pollution Prevention Institute, https://app.livestorm.co/p/37249dee-285b-491a-9ed1-06e6ce2735a1. Accessed February 13, 2022.

[394] "New York State Pollution Prevention Institute," RIT, https://www.rit.edu/affiliate/nysp2i/sites/rit.edu.affiliate.nysp2i/files/docs/resources/Food_Waste_Self-Assessment_How-to%20Guide_NYSP2I.pd. Accessed February 13, 2022.

[395] "Food Donation and Food Scraps Recycling Law", NYS Dept. of Environmental Conservation, https://www.dec.ny.gov/chemical/114499.html. Accessed February 13, 2022.

[396] "Restaurant Food Waste Action Guide", ReFED, 2018, https://refed.org/downloads/Restaurant_Guide_Web.pdf.

[397] "Foodservice Food Waste Action Guide", ReFED, 2018, https://staging.refed.org/downloads/Foodservice_Guide_Web.pdf.

"Recommendations for the City of Kingston", the literature review included the Organics Diversion Strategy published by the Regional District of Central Kootenay,[398] the Commercial Organics Diversion Plan from Austin, Texas,[399] "Food Scrap Recovery Policies" from the Institute for Local Self-Reliance,[400] the "History of Garbage and Recycling"[401] published by the City of Portland, Oregon, and the U.S. EPA document "Examples and Resources for Transforming Waste Streams in Communities (#1-50)".[402]

B. RECOMMENDATIONS ON ORGANICS DIVERSION FROM COMMERCIAL FOOD BUSINESSES

- **Phase in commercial collection in combination with Ulster County legislation.** New legislation from the State of New York and from Ulster County, the Food Waste Prevention and Recovery Act,[403] requires food scrap recycling and composting at a certain number of large facilities. The requirements for Ulster County, being more restrictive, are shown in Figure 78. Kingston has the option of applying this requirement at smaller restaurants and food establishments as well, perhaps at an accelerated timeline beyond the Ulster County legislation or in combination with it. In conjunction with a residential opt-in program, Kingston could use a phased-in approach to bring in larger restaurants and retail locations first that might not already fall under the State or Ulster County legislation, and then smaller restaurants and retail locations. A phased approach will serve to address the largest generators first, establishing effective educational tools, protocols and procedures, both for the City and the establishments, before then rolling out the implementation to all small establishments. This approach could be pursued through either a pilot program, or an initial voluntary opt-in phase for commercial customers whose refuse is already collected by the City. A pilot approach would allow for the City to address implementation challenges related to food waste diversion, storage, collection, or location. The gradual phase-in of commercial collection should be carefully timed and planned, with initial

[398] "Organics Diversion", https://www.rdck.ca, https://www.rdck.ca/EN/main/services/waste-recycling/organics-diversion.html. Accessed December 16, 2021.

[399] "Commercial Organics Diversion Requirements", AustinTexas.Gov," https://www.austintexas.gov/bizorganics. Accessed December 16, 2021.

[400] "Food Scrap Recovery Policies", Institute for Local Self-Reliance, https://ilsr.org/rule/food-scrap-ban/. Accessed December 20, 2021.

[401] "History of Portland's Garbage and Recycling System", Portland.gov, https://www.portland.gov/bps/garbage-recycling/history-portlands-garbage-and-recycling-system. Accessed December 20, 2021.

[402] "Examples and Resources for Transforming Waste Streams in Communities (#1-50)", US EPA, REG 09. 2015, https://www.epa.gov/transforming-waste-tool/examples-and-resources-transforming-waste-streams-communities-1-50 Accessed December 20, 2021.

[403] "Food Waste Prevention and Recovery Act", Ulster County.

participants identified ahead of time, stakeholder engagement done with the organizations available to accept donated food, and a set number of months or years for each phase.

Large food scraps generators shall be subject to the requirements of § **304-51** as of the following dates:

A. Beginning January 1, 2021, a large food scraps generator whose acts or processes produce more than two tons per week of food scraps;

B. Beginning January 1, 2022, a large food scraps generator whose acts or processes produce more than one ton per week of food scraps;

C. Beginning January 1, 2023, a large food scraps generator whose acts or processes produce more than 0.75 ton per week of food scraps; and

D. Beginning January 1, 2024, a large food scraps generator whose acts or processes produce more than 0.5 ton per week of food scraps.

Figure 78. Section 304-51 of the New York State Food Waste Prevention and Recovery Act, focusing on large food scraps generators.

- **Dedicate staff time of a recycling coordinator to develop and provide education and guidance to businesses.** The Commercial Food Waste Reduction Guide outline in this section can serve as a starting place for businesses to consider the food waste diversion and composting practices most appropriate to their particular needs. However, there remains an important role for dedicated staff to develop and provide education and guidance to businesses, such as hands-on coordination of best practices, implementation plans, signage templates, assistance with communication, troubleshooting, assistance with training staff, advising on issues of non-compliance, management of composting program funding and costs, and education on reducing contamination. The City has the option of considering a one or two-year appointment to oversee commercial food waste collection, after which duties could be transferred to existing staff.
- **Aid commercial organics collection implementation.** There are a number of tools available to encourage the adoption of composting practices at commercial establishments. The City has the option of applying for a NYS DEC grant for Recycling Coordination and Education.[404] This funding could partially fund the printing of standardized composting signs or purchase of appropriately sized and colored bins for distribution as well as the development of educational tools and resources and enforcement strategies.

C. COMMERCIAL BUSINESS FOOD WASTE REDUCTION GUIDE

This section recommends food waste reduction and diversion practices for commercial businesses before composting, such as inventory and tracking food waste.

C.1. STEP 1. BACK-OF-HOUSE FOOD WASTE REDUCTION PRACTICES

1. EFFECTIVELY TRACKING WASTE

The first step to reducing food waste at a restaurant or commercial business is effective inventorying of product and food waste; this step has the highest cost-reduction potential.[405] This can be done by determining when and where over-prep of ingredients is occurring back-of-house, and which meals are

[404] "Grants for Recycling Coordination and Education Projects", NYS Dept. of Environmental Conservation,", https://www.dec.ny.gov/chemical/105613.html. Accessed November 23, 2021.

[405] "How to Reduce Food Waste in Your Restaurant", ToastTab, https://pos.toasttab.com/blog/on-the-line/reduce-food-waste. Accessed November 18, 2021.

being discarded front-of-house. Food waste from prep can also be collected in buckets and tracked at the end of a shift using a quick waste journal.

2. PROPER INVENTORYING

Especially if a business uses a lot of seasonal or local produce, it's important to track the dates and times when things came in, and use the FIFO method (First In, First Out). Follow the NYS Pollution Prevention Institute's guidance on date labeling.[406] When a business runs up against a large stock of a certain ingredient, they can plan a weekly or daily special focused around that ingredient, incorporate it into multiple dishes, or feature it in a soup.

3. EFFECTIVELY FORECASTING DEMAND

If the business is not already doing it, electronic receipts can track the hours and days at which the restaurant tends to be busiest, accurately forecasting demand and reducing over-prepping.[407] It's better to be overprepared than under, but if you're prepping too much salsa in the evenings to meet the dinner rush, and half of it's unused, your margins are going down. Effectively forecasting demand (daily, weekly, seasonal) can help a business run more smoothly *and* help reduce food waste.[408]

C.2. STEP 2. DONATING EDIBLE FOOD

1. NEW YORK STATE FOOD DONATION AND FOOD SCRAPS RECYCLING LAW

After back-of-house food waste reduction practices outlined above are implemented, the next step towards food waste reduction and composting is donation of excess edible food. Under New York State's Food Donation and Food Scraps Recycling Law,[409] effective January 1st, 2022, all food generators that generate more than 2 tons of food waste per week are required to a) donate excess edible food and b) recycle all remaining food scraps if they are within 25 miles of an organics recycler with excess capacity. This means that large food generators, including multiple businesses within Kingston's limits (link to the full list[410]) are required to donate any excess food and some are required to recycle remaining food scraps.

2. GOOD SAMARITAN LIABILITY PROTECTIONS

Fortunately, there are protections in place for businesses that donate food in good intent. The Federal Bill Emerson Good Samaritan Food Donation Act, in conjunction with New York's Good Samaritan law, provides strong liability protection for businesses that donate food in good faith and do not act with gross negligence.[411] Additionally, businesses that donate food can claim general or enhanced federal tax deductions for food donation to a 501(c)(3) not-for-profit. The 24-page New York State Food

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[406] "Legal Fact Sheet", Harvard Law School Food Law and Policy Clinic, September 2018, https://www.rit.edu/affiliate/nysp2i/sites/rit.edu.affiliate.nysp2i/files/docs/resources/NY_Date_Labeling_Legal_Fact_Sheet.pdf.

[407] "Food Waste Self-Assessment How-to Guide", RIT Pollution Prevention Institute, 2017, https://www.rit.edu/affiliate/nysp2i/sites/rit.edu.affiliate.nysp2i/files/docs/resources/Food_Waste_Self-Assessment_How-to%20Guide_NYSP2I.pdf.

[408] "How to Reduce Food Waste in Your Restaurant", ToastTab.

[409] "The Business Case for Reducing Food Loss and Waste", World Resources Institute, Table 3, pg. 15, 2017, https://champions123.org/the-business-case-for-reducing-food-loss-and-waste/.

[410] "Food Donation and Food Scraps Recycling Law", NYS Dept. of Environmental Conservation.

[411] "Legal Fact Sheet", Harvard Law School Food Law and Policy Clinic.

Donation and Food Scraps Recycling Guidance for New York State Businesses document provides more detail on best practices.[412]

3. REQUIREMENTS FOR FOOD DONATION

In general, businesses can donate packaged, shelf-stable, perishable, non-perishable and prepared foods *that have not been served.* Foods that have been improperly prepared or stored, or do not meet food safety regulations may not be donated. Hot food that is to be donated must be kept at 140° Fahrenheit or above; hot food that is cooled and donated cold must be cooled from 140°F to 70°F within 2 hours and from 70°F to 45°F or below within 4 hours; and cold food must be kept at 45°F or below. Prepared foods should be labeled with the item name, date and time it was saved, and the name of the receiving entity. Any allergens should be labeled and logs should be kept indicating that proper temperature was maintained.[413]

4. COORDINATING WITH DONATION ORGANIZATIONS

It is important to know when working with a donation organization whether they accept prepared foods, or just pre-packaged; whether or not they have storage space for foods that need refrigeration; or whether they only accept items with a minimum number of servings for distribution.[414] Food banks may only accept pre-packaged foods, while soup kitchens may have a required minimum number of servings. Some local farms may accept food scrap donations for animal feed. A donor may need to partner with more than one organization to find homes for all surplus food products.

For businesses looking to donate food within Kingston, Feeding New York State[415] is available to connect businesses with donation organizations. Below listed are a few organizations within Kingston that may accept donations.

- **Ulster County Community Action:** Located at 70 Lindsley Avenue, Kingston, NY 12401. Accepts any amount of canned goods, bread if it's not expired, eggs, prepared meals, and fresh food if freezable. However, donations over a certain size should be arranged with the Outreach Manager – UCCA gets substantial deliveries at certain periods of the week, and may have limited availability to accept prepared food during those times.[416]
- **Catholic Charities of Kingston Food Pantry**:[417] Located at 6 Adams St #3, Kingston, NY 12401. Accepts shelf-stable and refrigerated foods, frozen and fresh produce and meat in bulk orders as long as immediate processing is not required. They do not accept prepared foods, but do accept food from restaurants if it is in the original packaging.
- **People's Place:**[418] Located at 17 St James St, Kingston, NY 12401. Will accept produce, bread, meat, some dairy, pastries and canned foods, as well as prepared foods from restaurants if there is an established relationship. Must be individually packaged.

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[412] "New York State Food Donation and Food Scraps Recycling Guidance for New York State Businesses", NYS DEC.

[413] "New York State Food Donation and Food Scraps Recycling Guidance for New York State Businesses", NYS DEC.

[414] "New York State Food Donation and Food Scraps Recycling Guidance for New York State Businesses", NYS DEC.

[415] "Feeding NYS", Feeding New York State, https://feedingnys.org/. Accessed November 23, 2021.

[416] "Outreach Services", Ulster County Community Action, https://uccac.org/programs/outreach-services/. Accessed March 13, 2023.

[417] "Catholic Charities of Kingston Food Pantry", Regional Food Bank of Northeastern New York, https://regionalfoodbank.net/agencies/catholic-charities-of-kingston-food-pantry/. Accessed March 14, 2023.

[418] "People's Place", https://www.peoplesplace.org/. Accessed March 14, 2023.

C.3. STEP 3. PURSUE IN-HOUSE COMPOSTING VS. OUTSOURCING FOOD WASTE REMOVAL

Those restaurants or commercial businesses that are required to compost food scraps will need to determine whether to pursue on-site composting or to contract with a hauler or the City to remove their sorted food waste and transport it to a reasonably distanced organics composting site. The "Haulers" section in this Study contains more detailed information on companies that are available to contract with businesses for food waste removal and transport.

1. ADVANTAGES AND DISADVANTAGES

Most restaurants, grocery stores, and food establishments in the City of Kingston will likely elect to have their food waste collected and transported to an organics recycling site rather than processing on-site. The relative ease of using a hauler, constraints on staff time for appropriately managing compost, a lack of available space or tools for composting, and/or a lack of use for the output are all strong arguments in favor of outsourcing.

However, there are benefits to processing food waste on site for certain businesses. For instance, restaurants or food establishments that desire a higher level of visibility into the food waste recycling process, and have a use for the finished compost (i.e., attached gardens or a relationship to a community partner) may be interested in on-site composting. Moreover, composting on-site can reduce the necessity of paying a hauler to transport food waste, and requires only the initial costs of composting equipment.

2. BUDGETARY DECISIONS

In a budgetary sense, the decision between on-site composting and contracting a hauler is a decision between initial on-site costs (technology, space preparation, staff time), or ongoing monthly costs of contracting. Businesses with available staff may be eager to make the initial investment in the necessary composting technology (note: Composting Technologies in this Study), and by doing so avoid the monthly costs of contracting with a hauler. However, on-site composting comes with the consideration of additional staff time and necessary space. Off-site food scraps management offers lower labor and time requirements, low upfront costs, and no need to manage output material on-site.

Unless otherwise noted, the recommendations in this section are drawn specifically from the NYS P2I webinar "Effective Steps to Launch a Food Scraps Diversion Program".[419]

3. GUIDELINES FOR OFF-SITE COMPOSTING

3.1. Assess Waste

Assess the amount of waste that the business generates to estimate collection costs and necessary storage space.

3.2. Compare Haulers

Compare the choice of haulers available (see "Haulers" section in this Study) and ongoing costs of collection, which will vary by collection frequency, the number and size of bins, and the hauler's billing

[419] Livestorm, "Effective Steps to Launch a Food Scraps Diversion Program for Businesses".

structure. Collection frequency should minimize odors and pest attraction. Warmer months may require more frequent collection.

3.3. Storage Space

Assess and prepare storage space. Most compost will be picked up once or twice weekly, sometimes on the same day as a typical waste hauler, meaning that food scraps may have to be properly stored in appropriate, dry, closed waste bins for up to a week. Given this, storage spaces need to accommodate enough food waste for at least a week, or collection must be scheduled more frequently. It is necessary to ensure that storage does not get odorous.[420]

3.4. Contamination

Research the percentage of contamination allowed by the hauler, and estimate the establishment's ability to meet that requirement through waste audits the first couple of weeks of separate food waste collection. In the initial stages of a composting program, there are bound to be mistakes by customers and/or staff as to what is compostable. However, too many of these mistakes (i.e., an elevated level of plastic or non-compostable matter in the composting bag) may result in higher costs or the termination of a waste contract with a particular hauler.[421]

Staff training and appropriate signage are particularly important in avoiding or reducing contamination. Biodegradable service ware (see Compostable Product Options in this Study) may reduce the possibility of that contamination in front-of-house as well. Compostable liners for bins reduce the use of plastic for transporting food scraps, and contributes to environmental benefit - some haulers may require or provide them.

4. GUIDELINES FOR ON-SITE COMPOSTING

4.1. Evaluate Waste

Evaluate the amount of food waste the business produces through waste audits the first few weeks of organics diversion.

4.2. Storage Space

Assess the amount of storage space available, and whether it can be distanced from the restaurant or business, or be maintained to remain odorless.[422] It is important that the storage space is dry, contained, and relatively distanced from food preparation or serving areas in order to reduce the likelihood of attracting animals and insects, especially if food waste is even slightly likely to be contaminated with meat scraps.

4.3. Select Composting Technology

Refer to the "Composting Technologies" section in this Study and compare the costs of different composting technologies as well as their advantages and disadvantages of different composting technologies. For instance, open-air composting has much lower initial costs, but requires more staff

[420] "Food Waste Prevention and Recovery Act", Ulster County," https://ulstercountyny.gov/environment/food-waste-prevention-and-recovery-act. Accessed November 23, 2021.

[421] "New York State Food Donation and Food Scraps Recycling Guidance for New York State Businesses", NYS DEC,

[422] "Food Waste Prevention and Recovery Act", Ulster County.

time than some short-term anaerobic digesters, which produce a sludge that needs to oxidize but is odorless and does not require turning.[423] Composting in-house generally means that meat or dairy might not be able to be composted, while commercial composters can typically handle that type of food waste.

4.4. Staffing

Estimate the amount of staff time necessary for employees to maintain the selected composting method; allocate and train staff to accommodate for time needed for turning compost, checking temperature, and estimating ratios of food waste to brown material in order to produce quality compost.

4.5. Composting Materials

Evaluate available space and provision of 'brown' compost material. On-site composters should be able to hold multiple weeks' worth of compost in order for the compost to mature; and must have the appropriate ratio of brown-to-green matter for the compost to not become acidic or turn to a smelly, unusable sludge. That means sourcing and storing fallen leaves, sawdust, or other 'brown' materials in quantities appropriate for the amount of food waste produced.

4.6. Plan for Reducing Disease Vectors

Ensure that there is a contingency plan in place for reducing disease vectors, such as the attraction of rodents and insects. A properly maintained, regularly turned compost pile with an appropriate brown-to-green ratio will be less likely to attract pests, but if pests to appear, the use of rodenticides or pesticides would render the compost unusable. Instead, physical barriers to pests can be put in place, and firmly sealed lids can stop insects from nesting in the compost.

4.7. Finished Compost Use

Determine internal usage or distribution and sale of the end product. It is likely that a food establishment would produce more compost than useful for a small herb or vegetable garden, while a commercial business establishment might produce enough for internal usage only.

C.4. STEP 4. CONDUCT A SIMPLIFIED WASTE AUDIT

Once an establishment has made a decision about on-site or off-site composting, it's necessary to estimate the amount of organics waste the business generates through a waste audit. There are ways to simplify this process, and it only needs to be conducted a few times in the first stages of the initiation of composting to analyze the amount of waste that will be collected.

1. BENEFITS OF CONDUCTING A WASTE AUDIT AND TRACKING METRICS

Conducting a waste audit and tracking metrics will, for off-site composting, allow the business to calculate necessary storage space, collection frequency, and estimate hauler costs; and for on-site composting, allow the business to accurately determine storage space, the amount of brown material needed, and the effort necessary to conduct an in-house composting operation. Moreover, it allows

[423] "The Advantages and Disadvantages of Anaerobic Digestion vs Composting", The Anaerobic Digestion & Biogas Blog, September 17, 2021, https://blog.anaerobic-digestion.com/anaerobic-digestion-vs-composting/.

the business to track metrics for the entire food waste reduction operation – the type of waste created by certain foods in back-of-house, the meals that aren't consumed front-of-house, etc.

Depending on the methodology of the waste audit, that tracking allows for better inventorying, further reduction of costs, and stronger staff motivation to implement an effective food scraps composting program.[424] Waste tracking and analytics can reduce pre-consumer waste by up to 50%.[425] Tracking metrics (calculating reduction of food waste) can also be a motivating factor for employees and customers, especially if the results of food scrap diversion programs (i.e., amount of compost produced, or GHG emissions avoided) are displayed within the business, used in marketing materials, or form part of an overall sustainability plan.

2. OPTIONS FOR CONDUCTING A WASTE AUDIT

There are any number of ways to conduct a waste audit - each business should choose that which works best for the individual business, and combine or alter approaches. Options range from as simple as a) counting the number of bags of food scraps generated, to b) weighing back-of-house and front-of-house food scrap collection bins, c) to hand-inventorying contents of waste bins and d) tracking electronic tickets to improve inventorying.[426] The most simplified version of the audit involves e) having a hauler weigh the food waste on collection, but this provides little information as to the type of food scraps collected. The most complicated approaches may be time-consuming, but only need to be repeated for the first week of the composting initiative to gain sufficient information to implement a full-scale waste reduction program.

3. RECOMMENDED WASTE AUDIT APPROACH

Restaurants or food-producing businesses interested in understanding their food waste and reducing associated costs are recommended to undertake the initial one-week audit, *and* weigh bags of food scraps at collection by the hauler for the duration of the composting initiative. This not only allows businesses to understand what their waste is composed of and how to reduce it, but also allows them to track metrics. Most haulers are prepared to weigh collections, and can provide receipts of the weights tracked and diverted.

For the one-week audit: Businesses can use the NYS Pollution Prevention Institute's Food Waste Self Assessment Tool[427] as guidance, or can conduct a simplified version of the one-week audit by separating front-of-house and back-of-house refuse; and separating the contents of those bags into the following categories: takeout products (cups, plates, containers, etc.), paper goods, produce, meat, plastics, and other.[428] Next, the distinct piles should be weighed and tracked. This process should be repeated at closing every day for a week, then the data should be analyzed to determine the composition of the waste. To ensure better inventorying and cost reduction, businesses should pay specific attention to those meals that are discarded and to discarded prep materials on particular days

[424] "How to Reduce Food Waste in Your Restaurant", ToastTab.

[425] "Food Service Food Waste Action Guide", ReFED, 2018, https://staging.refed.org/downloads/Foodservice_Guide_Web.pdf.

[426] "Restaurant Food Waste Action Guide", ReFED, 2018, https://refed.org/downloads/Restaurant_Guide_Web.pdf.

[427] "Food Waste Self-Assessment How-to Guide", RIT Pollution Prevention Institute.

[428] "How to Reduce Food Waste in Your Restaurant", ToastTab.

of the week. It may be useful to repeat the process with the front-of-house waste one or two days each month in the beginning of the composting initiative to track how effective signage, promotion and education efforts may be in reducing plastic contamination.

If a business is interested in a less effort-intensive alternative, the hauler can weigh the sum of the bags of food scraps provided; or simply tally the number of bags of food scraps thrown out every night. This is a more long-term solution, and provides less information.

C.5. STEP 5. EDUCATION AND PROMOTION

In order to run a successful food scraps collection program within a commercial business, it is necessary to train staff and educate customers about how to properly separate food scraps at the source. There are a number of tools that can make this process simpler and more effective. Those below are drawn and modified from the NYS P2I.

1. CLEAR SIGNAGE

Especially at the beginning stages of a composting initiative, implementers may be confused about what is compostable. Clear signage is the most important step for educating customers about source separation. Signage should be paired with every bin, clearly visible, with appropriately sized text. Typically, pictures are better than words. (Appendix H. Case Studies in this Study's Appendices provides a collection of potential signage options for businesses that have been employed by other local governments.)

2. APPROPRIATE COLLECTION BINS

It is important to ensure that a business has the appropriate number of food scrap collection bins, and that the bins are emptied regularly throughout the day when they get full. The bins that are selected should be differentiated for types of waste in order to provide clear visual cues; the standard colors are blue for recycling, green for food scraps, and black for refuse. If it is difficult or expensive to differentiate bins by color, signs in the appropriate color should be affixed to the bins.

3. STAFF ENGAGEMENT AND TRAINING

Without an engaged staff, the composting program might fail. It is critical to engage staff with sufficient initial training and inclusion of composting guidance in new staff training materials, listen to their feedback and suggestions, and problem-solve during regular check-ins. Assign a particular staff member to manage the program and collect feedback.

4. TIMING OF PROGRAM ROLL-OUT

Consider a phase-in rollout with easier areas first; then expand over time. It may make sense to start back-of-house composting first, then expand as employees are trained and become more confident with the requirements.

5. STAFF CONSIDERATIONS

If the front-of-house program is streamlined from the beginning, signage is clear, and staff are well-prepared to manage the program, contamination of food scraps will be reduced and less effort will be required to clean food scrap bins.

6. TRACKING METRICS

Beyond allowing better inventorying of back-of-house food prep waste, and front-of-house discarded meals, tracking food waste metrics by, for example, weighing waste bags or tallying their count, is a motivating factor for both staff and clientele. Public display of reduced food waste metrics can improve both the percentage of contamination as well as employee and customer satisfaction.

IMPLEMENTATION RECOMMENDATIONS

This Study assessed the recommendations made as part of the various components of the Study's research; Recommended Strategies appear at the beginning of this Study. Recommended strategies informed the phased implementation.

1. PHASED IMPLEMENTATION

The implementation plan outlined here has been broken into three phases – with each phase taking approximately one year and building on the previous phase to reach full, mandatory organics diversion from municipal buildings, residential buildings, and commercial businesses in year three.

- Phase 1: Entails starting organics collection in municipal buildings, creating a drop-off program for Kingston residents, and an opt-in commercial curbside pickup program for the Tuesday run.
- Phase 2: Expands organics collection to select municipal recreation pavilions, a partial rollout through a pilot or opt-in curbside pickup program for two of the four residential collection days, and a full mandatory roll-out of curbside organics commercial collection.
- Phase 3: Expands the municipal facility program to the recreation centers, completes the residential roll-out to all residences, and maintains the commercial program.

Actual Estimated Program Cost		
Total Cost Savings from Tipping Fees		
	1,078.71	tons, Total
$	90.00	tipping fee savings/ton
$	97,084.08	Total Cost Savings
Program Costs		
$	58,487.94	Ongoing costs
$	97,084.08	Total Estimated Cost Savings
$	(38,596.14)	Actual Estimated Program Cost
Years to Recuperate Net Cost of Intial Investment		
$	334,596.29	Net Cost Phases 1-3
$	38,596.14	Net Program Cost Savings
	8.67	**Years**

While the conservatively estimated food waste collection rate of 16.51%, as discussed in "Food Waste Estimates" in this Study, projects an annual savings of $179,840 in tipping fees, or $1,079,041.07 over a 6-year period (calculated at the current $110/ton tipping fee), the Program Implementation plan took an even more conservative estimate with regards to municipal facilities and commercial collection. This Study, however, anticipates that the City's education and outreach efforts will result in the conservative collection tonnages being surpassed. The conservative Program Implementation budget estimates a recuperation on the City's investment within nine years with modest annual cost savings. Were the City to reach the full, yet still conservative collection rate of 16.51%, the anticipated cost savings of $179,840 in annual tipping fees would fully cover the budgeted expenditures for Phases 1 ($96,414.41) and 2 ($93,215.38). It should be noted that even the 16.51% collection rate is quite conservative on the residential side, and could be substantially increased with a strong and consistent engagement and outreach program.

The estimated Program Implementation budget shows annual program costs net of tipping fee cost savings totaling $68,587.39 in year 1, $20,898.04 in year 2, and $245,110.86 in year 3. Costs in year 1 are higher due to the purchase of a used split-body rear load garbage truck and in year 3 due to the purchase of residential curbside food waste collection kits (kitchen collectors, collector bin liners, and

curbside totes). Additional savings could accrue to the City if the residential kitchen kits were sold at cost to households. The estimated budget assumes no additional DPW staff is needed to do the curbside pickup with the purchase of the split body truck. This will need further evaluation and discussion with Kingston staff.

A. PHASE 1 PROGRAM IMPLEMENTATION

Actual Estimated Program Cost		
Total Cost Savings from Tipping Fees		
$	309.19	tons, Total
$	90.00	tipping fee savings/ton
$	27,827.03	Total Cost Savings
Program Costs		
$	96,414.41	Phase 1 Estimated Budget
$	27,827.03	Total Estimated Cost Savings
$	**68,587.39**	**Actual Estimated Program Cost**

The total estimated budget for Phase 1 is $96,400 with the purchase of a used split body rear load truck; applying anticipating cost savings from tipping fees of $27,800 brings the year 1 cost down to $68,600. As noted above, this budget assumes food waste collection completed with existing DPW / Parks & Rec staff. It also assumes municipal outreach and engagement distributed through existing communication pathways. And it assumes food waste drop-off at UCRRA. Most tote pricing in the budget is based on bulk ordering. Monthly radio promotion and six annual local TV promotions are assumed at no cost.

A.1. MUNICIPAL BUILDINGS

Municipal Facilities -- Buildings		
Equipment		
	11	# food waste collection totes
$	47.58	cost per 34 gal. tote
$	523.38	Subtotal
Outreach & Engagement		
	8	materials design, hrs
$	35.00	designer rate / hr
$	280.00	Subtotal
	132	quantity materials printed
$	0.65	printing cost/sheet
$	85.80	Subtotal

It is recommended that the City provide educational flyers for each kitchen/eating area, along with appropriately sized totes, on each floor of municipal buildings. To ensure staff participation, it is recommended that the City provide, for example, onsite trainings and events to recruit and educate staff on the program and compostable food waste and serving ware. In addition, the program coordinator should maintain communications with staff/buildings throughout the life of the program. This may include regular emails and surveys, phone calls, and/or site visits to provide education and updates and to collect staff feedback.

The budget suggests 11 34-gallon food waste collection totes for municipal buildings as well as outreach and engagement materials to ensure the organics are collected without contamination. The tote estimate is based on Kingston's buildings and the floors in those buildings.

A.2. RESIDENTIAL

Residential -- Small-Scale Uses & Drop-offs		
Equipment		
	18	# food waste collection totes
$	54.86	cost per 64 gal. tote
$	987.48	Subtotal
Outreach & Engagement		
	16	materials design, hrs
$	35.00	designer rate / hr
$	560.00	Subtotal
	6649	quantity materials printed
$	0.65	printing cost/sheet
$	4,321.85	Subtotal

As noted in the Case Studies section in this Study and this Study's Appendices, many smaller communities begin their food scrap collection with drop-off locations for residents and/or incorporate drop-off locations into their overall program. As discussed in "Kingston Composting Site Analysis", there are numerous locations in Kingston that can serve as drop-off organics collection sites in addition to curbside collection. Approximately 20 communities in Westchester County operate drop off composting sites that run similarly to this based on a model created in Scarsdale.[429]

The budget recommends purchasing 18 64-gallon food waste collection totes for drop-off sites identified in Map 2. City of Kingston Locations Viable for Composting-Related Activities provides cost estimates for designing and printing materials for every household in Kingston to make them aware of the new program.

A.3. COMMERCIAL

Commercial -- Tuesday Opt-in Roll-out		
Equipment		
	89	# food waste collection totes
$	47.58	cost per 34 gal. tote
$	4,234.62	Subtotal
Equipment - trucks		
	1	25-yd split body rear load truck
$	59,900.00	used truck cost
$	59,900.00	Subtotal
Outreach & Engagement		
	16	materials design, hrs
$	35.00	designer rate / hr
$	560.00	Subtotal
	220	quantity materials printed
$	0.65	printing cost/sheet
$	143.00	Subtotal

It is recommended that Kingston begin commercial organics curbside pickup through an opt-in program on the Tuesday collection day route. The budget suggests 34-gallon food waste collection totes for all 89 food waste producing businesses on the Tuesday run. The budget also assumes four distributions of program outreach & engagement materials and includes design and printing costs for the businesses.

Finally, the budget also includes the purchase of a 25-yard split body rear load truck to collect the organics from the participating businesses at the same time as their recycling and/or refuse is picked up. It is recommended the City purchase a used truck to ensure the system works well before expending the resources required for a new truck. In addition, the used truck can be replaced by a zero-emissions heavy duty vehicle.

[429] "Residential Food Scrap Transportation and Disposal Program", Westchester County, Https://Environment.Westchestergov.Com/Food-Waste/Residential-Food-Scrap-Transportation-And-Disposal-Program-Rfstad. Accessed January 27, 2022.

A.4. TIPPING FEES

Tipping Fees -- Food Waste		
Municipal Food Waste		
	3.18	tons, total possible--buildings
	50.00%	collection rate anticipated
	1.59	tons, buildings subtotal
Residential Food Waste		
	70.20	tons, total possible--drop-offs
	25.00%	collection rate anticipated
	17.55	tons, drop-offs subtotal
Commercial Food Waste		
	580.10	tons, total possible--Tuesday
	50.00%	collection rate anticipated
	290.05	tons, Tuesday subtotal
Total Tipping Fees -- Food Waste		
	309.19	tons, Total
$	20.00	tipping fee/ton (UCRRA)
$	6,183.78	Total Tipping Fees

The budget estimates tipping fees for the annual estimated tonnages of organics collection from municipal buildings, for the residential drop-off program, and for the commercial curbside collection program. Tonnages are estimated at 1.59 tons for municipal buildings, representing 50% of the total possible 3.18 tons; 17.55 tons for residential drop-off locations, representing 25% of total possible 70.20 tons; and 290.05 tons for food businesses on the City's Tuesday run, representing a 50% collection rate of total possible 580.10 tons.

Total annual tipping fees from Phase 1 collection, based on the projected collection rates and program roll-out, are estimated at $6,183.78 for 309.19 tons of food waste. The annual estimate is based on UCRRA's current tipping fee/ton for food waste of $20/ton.

A.5. STAFF TIME

Staff Time -- All Outreach & Engagement		
	10.00%	percent staff time
$	186,345.00	staff salary
$	18,634.50	Subtotal

The budget also suggests an estimated amount of time existing Parks & Rec and DPW staff will spend on outreach and engagement for the new program; this estimate does not include time spent collecting and transporting organics as it is assumed that existing staff will complete this work. This was estimated by applying a 10% staff time estimate for outreach and engagement using staff salaries from Adopted Budget 2022 (pp. 106, 139, 153) for DPW Principal Account Clerk, Recreation Administrative Aide, Recreation Senior Account Clerk, Environmental Educator & Sustainability Coordinator, and Environmental Specialist 1.

B. PHASE 2 PROGRAM IMPLEMENTATION

Actual Estimated Program Cost		
Total Cost Savings from Tipping Fees		
$	803.53	tons, Total
$	90.00	tipping fee savings/ton
$	72,317.34	Total Cost Savings
Program Costs		
$	93,215.38	Phase 2 Estimated Budget
$	72,317.34	Total Estimated Cost Savings
$	**20,898.04**	**Actual Estimated Program Cost**

The second phase of the program is estimated to cost $93,215.38; applying anticipating cost savings from tipping fees of $ $72,317.34 brings year 2 costs down to $20,898.04. The program costs are largely due to the cost of the starter kits for residences and increase in tipping fees. The starter kit cost can be offset by asking residents to pay for the kitchen collectors and liners. Most municipalities with such a program do not offer these for free to residents.

B.1. MUNICIPAL FACILITIES

Municipal Facilities -- Rec Pavilions		
Equipment		
	13	# food waste collection totes
$	47.58	cost per 34 gal. tote
$	618.54	Subtotal
Outreach & Engagement		
	2	materials design, hrs
$	35.00	designer rate / hr
$	70.00	Subtotal
	288	quantity materials printed
$	0.65	printing cost/sheet
$	187.20	Subtotal

Phase 2 sees the municipal collection expanded to facilities, specifically recreation pavilions. It assumes 13 34-gallon food waste collection totes and four distributions of program outreach and engagement materials.

B.2. RESIDENTIAL

Residential -- Partial Roll-Out		
Equipment		
	884	# kitchen counter collectors
$	10.25	cost per counter collectors
	13260	# kitchen counter liners
$	0.15	cost per counter liners
	684	# 12-gal collection totes
$	33.75	cost per 12-gal collection tote
	200	# 64-gal collection totes
$	54.86	cost per 64-gal collection tote
$	45,103.58	Subtotal
Outreach & Engagement		
	16	materials design, hrs
$	35.00	designer rate / hr
$	560.00	Subtotal
	13672	quantity materials printed
$	0.65	printing cost/sheet
$	8,886.80	Subtotal

The partial roll-out to residents is recommended as an opt-in opportunity for 884 households. The opt-in can be made available to any Kingston household on any of its daily runs or along two specific runs. This Study recommends making the opt-in available to households on no more than two runs for collection efficiency; this study also recommends selecting runs that are reflective of the City's socioeconomic diversity. Providing an opt-in opportunity to 884 households would provide the City with sufficient learnings from the roll-out as they represent 13.3% of all households receiving Kingston waste collection or 53.18% of households on an averaged single run. (The residential runs collected by DPW laborers are 1,664 for Monday, 1,519 for Tuesday, 1,754 for Wednesday, and 1,712 for Thursday.)

The budget for the Residential -- Partial Roll-Out assumes an opt-in basis along up to two runs with 884 households participating. Budgeted are 884 2-gallon food waste kitchen counter collectors & liners sufficient for three weeks as well as 884 12-galllon curbside collection totes. This budget assumes 4 distributions of program outreach and engagement materials.

The City should be aware that many communities have also implemented opt-in programs where anyone in the community can sign up for curbside organics collection. Details of how Kingston could implement such a program are provided below. Many municipalities discussed in Appendix H: Case Studies have open enrollment for their opt-in programs, such as Ann Arbor, Cambridge, Iowa City,

Longmont, Minneapolis, and Scarsdale. Their websites detail how residents can sign up to start composting. The benefits of an opt-in program compared to including everyone on the route in the pilot are potentially lower contamination rates by only including those who the City knows are eager to separate organics. This budget anticipates the City readily obtaining 884 opt-ins and participants setting out the minimum tonnage calculated, 285.44 tons.

Noted below are considerations for an opt-in residential unrolling.

- Recruit Participants: This may include a variety of strategies such as placing A-frame signs in selected neighborhoods; distributing flyers and tabling at community meetings and events; mailers; sending flyers home from public schools; radio advertisements; stakeholder meetings; use of emails, surveys, and social media to determine interest in and promote the availability of the program; and communicating directly (e.g., door-to-door) with both residents and landlords of multifamily properties.
- Collection Schedule: Provide weekly organics collection to participants, ideally on the same day as regular refuse collection, or, if feasible, consider offering organics collection on an alternating-weekly schedule with refuse collection.
    - Curbside refuse collection frequency and tote size: If it is feasible to offer refuse collection on an alternating-weekly schedule with organics collection, the 96-gallon refuse tote that customers currently use could potentially be replaced with a smaller 32- or 48-gallon tote for refuse as part of the opt-in program, in addition to the new curbside compost totes. In this case the smaller new refuse tote would be distributed to participants in addition to the new compost tote. Costs for such a program are provided but would entail more tote purchases.
    - The City currently does not charge for refuse and recycling collection for residences. First, Kingston could maintain the current fee structure but cease offering weekly refuse pickup to incentivize using the compostable bin for food scraps, which would be picked up weekly, thus alternating to every other week refuse collection. This would work best after mandating organics diversion. Second, Kingston could create a monthly fee structure for refuse collection and offer cheaper rates for smaller refuse bins or collection less often, also referred to PAYT. This would further incentivize organics diversion and recycling.
- Communications with Participants: Maintain communications with participants throughout the program. This may include regular emails and surveys, phone calls, and site visits to provide education and updates and to collect participants' feedback and determine best practices. Also, as was the case in the roll out of dual stream recycling, a dedicated email, and phone number should be established for residents and businesses to obtain additional information.
- Data Collection: Monitor tote fill level, record contamination levels and type, and note other relevant information as needed. If unacceptable levels of contamination are found, a "rejection" sticker or educational tag should be placed on the unemptied totes, if necessary.
- Bagging Food Scraps: Consider requiring food scraps to be bagged, particularly during the winter months to prevent material freezing to the bin.
- Education and Outreach: There are many good education and outreach examples from best practices found in the case studies (see Appendix H. Case Studies). Any education and outreach content should build on the work Kingston has already done for the transition to dual-stream recycling. The budget allocates a nominal amount for design fees, but the City may consider

hiring a designer to create a suite of collateral materials to assist residents, and businesses, in effectively sorting their waste.

B.3. COMMERCIAL

Commercial -- Full Mandatory Roll-out		
Equipment		
	58	# food waste collection totes
$	47.58	cost per 34 gal. tote
$	2,759.64	Subtotal
Equipment - trucks		
	0	25-yd split body rear load truck
$	59,900.00	used truck cost
$	-	Subtotal
Outreach & Engagement		
	4	materials design, hrs
$	35.00	designer rate / hr
$	140.00	Subtotal
	284	quantity materials printed
$	0.65	printing cost/sheet
$	184.60	Subtotal

Phase 2 completes the curbside organics collection for food waste producing commercial businesses along all of Kingston's collection runs, totaling 147 businesses receiving refuse and/or recycling collection. Phase 2 is assumed to be mandatory for businesses receiving City refuse and/or recycling collection. The budget assumes 58 34-gallon food waste collection totes for the remaining businesses outside the Tuesday run, and four distributions of program outreach and engagement materials for all food-producing small business locations. Most tote prices are based on bulk ordering.

After the first program phase, Kingston should consider creating a concise and clear commercial ordinance to mandate the collection of organics. Below are relevant considerations.

- Language: See the "Municipal Code" section in this Study. This ordinance would require that those serviced by Kingston's DPW divert organics from their waste. It would also require that private haulers offer organics diversion to those they service. Ideally, this ordinance would also phase in organics diversion requirements for businesses over time, based on NYC's ordinance, including those with private haulers.
- Fines/Enforcement: Kingston has a robust fee schedule posted on the City's website. Ideally, any fines and enforcement styles created for the organics diversion program after the mandate goes into effect would match the structure in place for curbside recycling infractions, which is currently $85 per incident. The City had a grace period in effect for the transition to dual stream recycling and a similar grace period is recommended for the transition to mandating organics diversion.
- Takeout Containers: Kingston may consider an additional complementary ordinance for businesses and events targeting takeout containers that requires they be recyclable or compostable, to increase diversion. See the "Municipal Code" section in this Study.

B.4. TIPPING FEES

Tipping Fees -- Food Waste		
Municipal Food Waste		
	3.18	tons, total possible--buildings
	70.00%	collection rate anticipated
	2.23	tons, buildings subtotal
	6.76	tons, total possible--pavilions
	25.00%	collection rate anticipated
	1.69	tons, pavilions subtotal
Residential Food Waste		
	70.20	tons, total possible--drop-offs
	50.00%	collection rate anticipated
	35.10	tons, drop-offs subtotal
	285.44	tons, total possible--partial resi.
	285.44	tons, partial resi. subtotal
Commercial Food Waste		
	958.14	tons, total possible--all
	50.00%	collection rate anticipated
	479.07	tons, all subtotal
Total Tipping Fees -- Food Waste		
	803.53	tons, Total
$	20.00	tipping fee/ton (UCRRA)
$	16,070.52	Total Tipping Fees

The budget estimates tipping fees for the annual estimated tonnages of organics collection from municipal buildings and recreation pavilions, for the residential drop-off program and opt-in residential roll-out, and for commercial curbside businesses. Tonnages are estimated at 2.23 tons for municipal buildings, representing a collection rate increase to 70%; 1.69 tons for municipal recreation facilities, representing a 25% collection rate of total possible 6.76 tons; 35.10 tons for residential drop-off locations, representing a collection rate increase to 50%; 285.44 tons for the residential opt-ins; and 479.07 tons for food businesses at a 50% collection rate.

Total annual tipping fees from Phase 2 collection, based on the projected collection rates and program roll-out, are estimated at $16,070.52 for 803.53 tons of food waste. The annual estimate is based on UCRRA's current tipping fee/ton for food waste of $20/ton.

B.5. STAFF TIME

Staff Time -- All Outreach & Engagement		
	10.00%	percent staff time
$	186,345.00	staff salary
$	18,634.50	Subtotal

The same estimated staff salaries are included in Phase 2.

C. PHASE 3 PROGRAM IMPLEMENTATION

Actual Estimated Program Cost		
Total Cost Savings from Tipping Fees		
$	1,078.71	tons, Total
$	90.00	tipping fee savings/ton
$	97,084.08	Total Cost Savings
Program Costs		
$	342,194.94	Phase 3 Estimated Budget
$	97,084.08	Total Estimated Cost Savings
$	**245,110.86**	**Actual Estimated Program Cost**

The third phase of the organics program completes the municipal facility organics collection to include Recreation Centers. It also completes the residential roll out to all residents of Kingston and maintains the mandatory commercial program. Phase 3 is estimated to cost $342,194.94; applying anticipating cost savings from tipping fees of $97,084.08 brings year 3 costs down to $245,110.86. The program costs are due to the cost of the starter kits for residences and increase in tipping fees. The starter kit cost can be offset by asking residents to pay for the kitchen collectors and liners. As previously mentioned, most municipalities with such a program do not offer these for free to residents.

C.1. MUNICIPAL FACILITIES

Municipal Facilities -- Rec Centers		
Equipment		
	5	# food waste collection totes
$	47.58	cost per 34 gal. tote
$	237.90	Subtotal
Outreach & Engagement		
	2	materials design, hrs
$	35.00	designer rate / hr
$	70.00	Subtotal
	488	quantity materials printed
$	0.65	printing cost/sheet
$	317.20	Subtotal

Phase 3 sees the municipal collection expanded to recreation centers. The budget assumes five 34-gallon food waste collection totes for five recreation centers and four distributions of program outreach and engagement materials.

Given the use of recreation facilities and pavilions for events, the City should also consider mandating organics diversion at events, particularly for events hosted at City properties that require a permit. Below are relevant considerations.

- Events: Ensuring organics diversion at events can be accomplished by updating the Special Event Application form already in use by Kingston, which already mandates recycling and refuse collection for event producers. Kingston may also consider providing fact sheets, signage, etc., to event producers when they apply for a permit. As noted in Recommended Strategies, Kingston may consider requiring a waste plan for event producers before they are issued a permit (see "Organics Diversion at Events" in this Study and Appendix H. Case Studies in this Study's Appendices). Of the cities that mandate organics diversion, San Francisco has the most detailed and robust infrastructure around organics diversion at events: event producers are required to attend a training, create a plan, and more. Seattle and Portland take a slightly more hands-off approach, while still mandating the diversion of organics at events.

C.2. RESIDENTIAL

Residential -- Partial Roll-Out		
Equipment		
	5765	# kitchen counter collectors
$	10.25	cost per counter collectors
	86475	# kitchen counter liners
$	0.15	cost per counter liners
	5000	# 12-gal collection totes
$	33.75	cost per 12-gal collection tote
	765	# 64-gal collection totes
$	54.86	cost per 64-gal collection tote
$	282,755.40	Subtotal
Outreach & Engagement		
	8	materials design, hrs
$	35.00	designer rate / hr
$	280.00	Subtotal
	26596	quantity materials printed
$	0.65	printing cost/sheet
$	17,287.40	Subtotal

The remaining roll-out of the residential program adds the balance of Kingston households, 5,765. The budget for the full roll-out assumes includes the purchase of 5,765 2-gallon food waste kitchen counter collectors & liners sufficient for three weeks as well as 5,000 12-galllon curbside collection totes and 765 64-gallon curbside containers. This budget assumes 4 distributions of program outreach and engagement materials for all collection days. After the first program phase, Kingston may consider creating a concise and clear residential ordinance to mandate the collection of organics.

C.3. COMMERCIAL

Commercial -- Maintenance		
Equipment		
	15	# food waste collection totes
$	47.58	cost per 34 gal. tote
$	713.70	Subtotal
Equipment - trucks		
	0	25-yd split body rear load truck
$	59,900.00	used truck cost
$	-	Subtotal
Outreach & Engagement		
	4	materials design, hrs
$	35.00	designer rate / hr
$	140.00	Subtotal
	284	quantity materials printed
$	0.65	printing cost/sheet
$	184.60	Subtotal

Maintaining the mandatory commercial organics program is cost-efficient, the budget assumes some replacement costs for totes and outreach printing and design costs.

C.4. TIPPING FEES

Tipping Fees -- Food Waste		
Municipal Food Waste		
	3.18	tons, total possible--buildings
	90.00%	collection rate anticipated
	2.86	tons, buildings subtotal
	6.76	tons, total possible--pavilions
	50.00%	collection rate anticipated
	3.38	tons, pavilions subtotal
	6.06	tons, total possible--centers
	50.00%	collection rate anticipated
	3.03	tons, centers subtotal
Residential Food Waste		
	70.20	tons, total possible--drop-offs
	50.00%	collection rate anticipated
	35.10	tons, drop-offs subtotal
	555.27	tons, total possible--full resi.
	555.27	tons, partial resi. subtotal
Commercial Food Waste		
	958.14	tons, total possible--all
	50.00%	collection rate anticipated
	479.07	tons, all subtotal
Total Tipping Fees -- Food Waste		
	1,078.71	tons, Total
$	20.00	tipping fee/ton (UCRRA)
$	21,574.24	Total Tipping Fees

The tipping fees for Phase 3 will include all municipal facilities, drop-off locations and all household collection points, and all food waste producing businesses receiving City refuse and/or recycling collection (147). Tonnages are estimated at 2.86 tons for municipal buildings, representing a collection rate increase to 90%; 3.38 tons for municipal recreation facilities, representing a collection increase to 50%; 3.03 tons for recreation centers, representing a collection rate of 50% of total possible tons of 6.06; continued diversion of 35.10 tons of food waste from residential drop-off locations; 555.27 tons for all residential points; and continued diversion of 479.07 tons of food waste from food producing businesses.

Total annual tipping fees from Phase 3 collection are estimated at $21,574.24 for 1,078.71 tons of food waste. The annual estimate is based on UCRRA's current tipping fee/ton for food waste of $20/ton.

C.5. STAFF TIME

Staff Time -- All Outreach & Engagement		
	10.00%	percent staff time
$	186,345.00	staff salary
$	18,634.50	Subtotal

The same estimated staff salaries are included in Phase 3.

2. MUNICIPAL CODE

Draft legislation and/or code changes are presented below as a means of accelerating and supporting other recommendations presented in this study towards the implementation of a municipal organics diversion program. The legislation is based on best practices from other municipalities, as noted in the case studies, or template legislation, such as the NRDC's template legislation requiring municipalities to

use compost when possible in their operations. These changes are meant as examples and have not been reviewed by the City's attorneys.

The changes are presented in five sections. The first section presents the recommended changes to the City's current MSW code, drawing on language from municipalities that have incorporated organics diversion as a requirement into their ordinances. The second section is sample legislation requiring use of compostable or recyclable take out containers and the appropriate disposal of these containers. The third section provides suggested language in support of diverting organics from Kingston events. The fourth section is the template legislation from NRDC for compost procurement. Not included in this Study but available online[430] is the Ulster County Food Waste Prevention and Recovery Act, which was passed into law in 2019 and applies to large food scraps generators throughout Ulster County, including the City of Kingston.

A. CHAPTER 350 – SOLID WASTE CODE RECOMMENDED CHANGES

Changes recommended to the City of Kingston Solid Waste Code, Chapter 350. Solid Waste,[431] are based on the recommendations in this Study, including incorporating yard waste in curbside organics collection and allowing for BPI certified plastics in the collection. Some additions are based on San Francisco's code. The balance of recommendations was written to align with the City's current code, based on the research conducted for this Study. Recommended changes appear yellow-highlighted as part of the section in which they are recommended for incorporation; ecode hyperlinks are included without additional referencing; ellipsis (…) are used to indicate where original code language appears before or after the recommended changes within a section of the code. Notes on specific code sections appear in *italics*.

§ 350-7. Definitions.

…

COMPOSTABLE MATERIAL

Any material that can be broken down into, or otherwise become, usable compost (e.g., soil conditioning material) in a timely and safe manner as accepted by Kingston's Organics Recycling Program, such as food scraps, soiled paper, and yard waste. Compostable materials can also include disposable plastic food ware and bags as long as they are labeled compostable and meet the BPI/ASTM standards for certification.[432]

…

§ 350-8. Responsibility for the collection and disposal of refuse.

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[430] "Food Waste Prevention and Recovery Act", Ulster County – Municipal Code, December 28, 2019, https://ecode360.com/36623724.

[431] "Chapter 350. Solid Waste", City of Kingston Municipal Code, https://ecode360.com/print/KI0280?guid=6725358&children=true#12699954. Accessed November 15, 2021.

[432] This definition is based on San Francisco's definition. "Ordinance 100-09", SF Environment, Accessed January 20, 2022. https://sfenvironment.org/sites/default/files/policy/sfe_zw_sf_mandatory_recycling_composting_ord_100-09.pdf. Seattle includes food scraps in their definition for recycling: https://library.municode.com/wa/seattle/codes/municipal_code?nodeId=TIT21UT_SUBTITLE_IIISOWA_CH21.36SOWACO_SUBCHAPTER_IISOWACO_21.36.083RERERE. Portland does not include any bioplastics, just food scraps: https://www.portlandoregon.gov/shared/cfm/image.cfm?id=194946.

…

E.

All persons in the City of Kingston must source separate their refuse into recyclables, organics, and trash, and place each type of refuse in a separate container designated for disposal of that type of refuse. No person may mix recyclables, organics, or trash, or deposit refuse of one type in a collection container designated for another type of refuse, except as otherwise provided in this chapter.[433]

§ 350-12. Limitations to municipal collection services.

[Amended 6-8-2004, approved 6-15-2004; 4-1-2008 by L.L. No. 1-2008, approved 4-23-2008]

Municipal collection shall be limited as follows:

A.

Residential properties.

…

(3)

Compostable Materials Collection.

(a)

Food scraps and other non-yard waste compostable materials must be properly containerized in a city-issued organics cart and placed curbside. Yard waste small enough to need containerization may be added to organics cart.[434]

(4)

Yard waste.

(a)

Grass clippings, leaves (except as noted in section on leaf collection), garden clippings and hedge clippings shall be small enough to need containerization and chippings.

…

[2]

All of the above must be properly containerized in a city-issued organics cart or brown biodegradable paper bag.

…

(c)

Leaves.

[Amended 6-8-2004, approved 6-15-2004; 4-6-2010 by L.L. No. 2-2010, approved 4-27-2010]

[1]

Leaves shall be collected from November 1 through November 30. Leaves must be containerized in brown biodegradable paper bags or containerized in a city-issued organics cart or a trash barrel or container no larger than 32 gallons, not to exceed 50 pounds.

…

(d)

[433] Based on San Francisco's text for responsibilities. "Ordinance 100-09", SF Environment, June 9, 2009. Accessed January 20, 2022. https://sfenvironment.org/sites/default/files/policy/sfe_zw_sf_mandatory_recycling_composting_ord_100-09.pdf.

[434] Multiple cities have such criteria. It varies in its specificity, with Portland noting "Weeds, leaves, vines, grass, flowers, house plants, plant clippings, pumpkins and Small branches (less than 4 inches thick and 36 inches long)" being allowed in the bin. Most other cities that allow yard waste in the organics bin just note that yard waste can go in the bin as long as it fits.

Anyone not in compliance with the provisions of the City of Kingston Code, § 350-12A(3)(c) or 350-12B(3)(c), as adopted by the Common Council on April 6, 2010, shall be subject to a fine of $35 for the first offense, with an incremental increase of $10 for each additional offense.
[Added 4-6-2010, approved 4-8-2010]
(5)
Wood waste.
…
(d)
Small pieces of wood must be containerized in city-issued organics cart or brown biodegradable paper bags.
…
§ 350-16. Receptacle specifications.
…
F.
Food scraps and other non-yard waste compostable materials shall be placed in a city-issued organics cart only.
…
§ 350-18. Licensing of private waste collectors.
Kingston could follow Portland, OR's example in this section and mandate private haulers to offer composting as an option for businesses and multi-family residences. Portland has enforced this requirement since 2005 to expand the availability of food waste hauler services, and has since seen a significant uptake in commercial organics diversion.[435] *Seattle and San Francisco do not mandate haulers specifically, but simply prohibit food waste from going in the garbage via a landfill ban. See Appendix H. Case Studies for further details.*

A.1. CODE CONSIDERATIONS FOR COMMERCIAL ORGANICS COLLECTION

The City may also wish to consider additional Code language to support commercial organics diversion programs at restaurants throughout the City.

1. BANNING ORGANICS IN LANDFILLS AND NONCOMPLIANCE FEES

Kingston has the option of banning organics from landfills as well as developing fee schedules for noncompliance with composting ordinances or tipping fee surcharges for contaminated organics.[436] A number of municipalities have adopted various bans on commercial businesses over a certain size from landfilling food waste, including the cities of Austin, TX, and Portland, OR, as well as the states of Vermont, Massachusetts, and Rhode Island.[437] The year after Vermont instituted an organics ban, donations to food banks increased by 60%.[438] To reduce landfilled food waste, the City has the option of implement a surcharge on landfilled waste that contains a certain percentage of food waste or recyclable material. An alternative option is to levy a surcharge on composted waste that contains a

[435] "History of Portland's Garbage and Recycling System", Portland.gov, https://www.portland.gov/bps/garbage-recycling/history-portlands-garbage-and-recycling-system. Accessed December 20, 2021

[436] "Organics Diversion", https://www.rdck.ca.

[437] "Food Scrap Recovery Policies", Institute for Local Self-Reliance.

[438] Lori Lovely, "Collection Containers for Organic Waste", MSW Management, 2018, https://www.mswmanagement.com/collection/carts-bins/article/13032886/collection-containers-for-organic-waste.

certain percentage of non-compostable material. These types of surcharges, which occur at the point of disposal (e.g., transfer stations and landfills), can be transferred back to waste generators through elevated fees for waste collection when waste is "contaminated".[439] Contamination, in this sense, could refer to either the presence of food waste in loads delivered to landfills, or the presence of non-compostable waste in loads delivered to composting sites or transfer stations.

Developing and enforcing a tipping fee surcharge requires collaboration with haulers, in particular, as "waste haulers become the enforcers of the disposal ban since its implementation provides them with an opportunity to increase their market share if they can provide more cost-effective collection options to their customers."[440] This is a particularly effective education tool, though it may only be used the first one or two years of collection, as diversion becomes commonplace. The surcharge can also be escalated overtime, starting out relatively lower and increasing over time as organics diversion gets off the ground, in conjunction with higher adoption and collection rates.

2. ANNUAL REPORTING REQUIREMENTS FOR FOOD WASTE GENERATORS

The City of Austin, Texas requires large food waste generators to submit an organics diversion plan on a yearly basis.[441] The necessary components of Austin's diversion plan include annual reporting on the diversion plans, consisting of service receipts for organics diversion (frequency and weight), and a record of email communications from Austin Resource Recovery. Though Kingston may collect a significant portion of commercial organic waste, and could conceivably conduct this tracking internally, implementation of this option would be recommended for retail and food producing businesses that contract with private haulers as a means of better understanding and predicting the amount of food waste diverted by businesses on a monthly basis. It is also a beneficial requirement for businesses that select to self-transport food waste to a tipping station. Kingston would need to assess the generator size at which this requirement would be instituted, and could expand the participant size by offering organics diversion plan development and annual reporting participation as an option for interested generators of smaller sizes.

3. REPORTING REQUIREMENTS FOR SELF-TRANSPORTING / ON-SITE COMPOSTING BUSINESSES

Some commercial establishments may be interested in self-transporting food waste to a transfer station or commercial composting site, whether on-site or off-site. In those cases, Kingston has the option of requiring those businesses to register with the City[442] and to track their waste according to the reporting recommendations noted earlier (i.e., frequency and weight). Similarly, the City has the option of requiring those businesses that compost on-site to register their on-site composting equipment and to track their organics waste diversion and compost production.

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[439] "Regional District of Central Kootenay: Organics Waste Diversion Strategy", https://www.rdck.ca, https://www.rdck.ca/EN/main/services/waste-recycling/organics-diversion.html. Accessed December 16, 2021.

[440] "Regional District of Central Kootenay: Organics Waste Diversion Strategy", https://www.rdck.ca.

[441] "Commercial Organics Diversion Requirements", AustinTexas.Gov, https://www.austintexas.gov/bizorganics. Accessed December 16, 2021.

[442] In NYC, self-transporting businesses register with the NYC Business Integrity Commission. "DSNY - Commercial Requirements", NYC, https://www1.nyc.gov/assets/dsny/site/services/food-scraps-and-yard-waste-page/commercial-requirements. Accessed December 16, 2021.

B. DRAFT ORDINANCE – COMPOSTABLE/RECYCLABLE TAKE-OUT CONTAINERS AND THEIR DISPOSAL

The following paragraphs are draft ordinance language on the requirement for compostable or recyclable take-out containers and their appropriate disposal should Kingston pursue an organics diversion mandate. The language is lightly edited from Seattle's ordinance to make applicable for Kingston. This language would represent a new mandate for the State and Ulster County; legislating at the County and/or State level may be more advisable than regulating at the local Kingston level. Ulster County previously demonstrated leadership on similar regulations, such as plastic bags[443/444] and polystyrene,[445/446] both of which are now banned statewide.

A.
Effective [on date] food service businesses shall be prohibited from selling or providing food, for consumption on or off the premises, in or with disposable food service ware. Acceptable alternatives for prohibited disposable food service ware shall be compostable or recyclable.
B.
Food service businesses providing food for consumption on premises using compostable or recyclable food service ware must provide conveniently located and clearly marked containers where customers may discard compostable and recyclable food service ware and must provide for the collection and delivery of these materials to appropriate processing facilities.
C.
On such commercially reasonable terms as determined by the landlord, landlords of food service businesses subject to the requirements of this section shall make adequate space and/or services available to such food service businesses for the collection and pick up of the compostable and recyclable materials generated by such food service businesses.
D.
Landlords operating food courts or similar settings that include food service businesses and common areas set aside and maintained for the consumption of food and beverages shall provide in such common areas the services required in subsection B of this section.
E.
City Staff, at the direction of the Mayor and Common Council, are authorized to promulgate rules for purposes of interpreting and clarifying the requirements of this section. Such rules may provide temporary waivers or other relief that apply to use of certain food service ware products for a period of up to one year with the option for additional annual extensions should circumstances warrant. Such waivers or relief shall be granted only for circumstances where commonly used recycling and composting technology cannot process the food service ware, or where suitable alternative products that meet performance and food health and safety standards are unavailable.

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[443] "NYS Plastic Bag Ban in Ulster County", Ulster County Department of the Environment, Accessed February 1, 2022. https://ulstercountyny.gov/environment/waste-reduction/bring-your-own-bag-act.

[444] "Bag Waste Reduction Law", New York State, Accessed February 1, 2022. https://www.dec.ny.gov/chemical/50034.html.

[445] "Ulster County Executive Mike Hein Signs Local Law Prohibiting the Use Of Polystyrene Food Containers By Restaurants", Ulster County, April 17, 2015. https://ulstercountyny.gov/news/executive-press-releases/ulster-county-executive-mike-hein-signs-local-law-prohibiting-use.

[446] "Go Foam Free: Polystyrene Foam Ban", New York State, https://www.dec.ny.gov/chemical/120762.html. Accessed February 1, 2022.

F.

For purposes of this section, the following definitions shall apply:

COMPOSTABLE

Made solely of organic substances that break down into a stable product due to the action of bacteria in a controlled, aerobic commercial process that results in a material safe and desirable as a soil amendment meeting the compost quality standards described by the Biodegradable Products Institute (BPI). Materials should be labeled compostable and meet the BPI/ASTM standards for certification.

CONSUMED ON PREMISES

Consumption of food or beverages in the public areas of a food service business, common areas of a food court, outside seating areas and parking lots exclusively for customers of the food service business, rather than taken out for consumption elsewhere.

DISPOSABLE FOOD SERVICE WARE

Non-compostable and non-recyclable containers, plates, "clamshells," serving trays, meat and vegetable trays, hot and cold beverage cups, wrappers, and utensils that are intended only for one-time use, including so-called biodegradable products where any portion is not compostable.

FOOD COURT

An area of a retail mall, office building, sports facility or other premises where one or more food service businesses are located and customer seating for dining and consumption of beverages is provided in a common area.

FOOD SERVICE BUSINESSES

Full-service restaurants, fast food restaurants, cafes, delicatessens, coffee shops, grocery stores, vending trucks or carts, business or institutional cafeterias, and other businesses, selling or providing food within the City of Kingston for consumption on or off the premises.

RECYCLABLE

Made solely of materials that are capable of being separated from a waste stream by a food service business and made available for collection and delivery to a processor for reuse or remanufacture into the same or other products.

C. DRAFT ORDINANCE – ORGANICS DIVERSION AT SPECIAL EVENTS

The following is a draft new section that would be included in Chapter 310. Parks and Recreational Facilities; Article 1: General Rules and Regulations. The draft section reads as follows:

310-9 Recycling and Organics Diversion

It shall be unlawful for any person(s) holding a special event at a City facility to not divert recyclable materials or organics from the waste stream, as provided in the City of Kingston Special Events Permit and enforced by the Superintendent of Parks and Recreation and/or Public Works of the City of Kingston.

The following is a draft section that has broader application beyond Parks and Recreational Facilities. It is based upon San Francisco's Requirements for Owners or Managers of Food Vendors and Events. This language could be added to the Solid Waste Code. The draft section reads as follows:

Owners or managers of food vendors and events must provide adequate refuse collection service to their employees, contractors, and customers.

Owners or managers of food vendors and events must supply appropriate containers, placed in appropriate locations, to make source separation of recyclables, compostables, and trash convenient for the employees, contractors, and customers of the food vendors and events. The containers must:
1. Be of appropriate number and size in light of the recyclable, compostable and trash quantities reasonably anticipated to be generated at the location;
2. Bear appropriate signage and be color coded to identify the type of refuse to be deposited – blue for recyclables, green for compostables, and black for trash—and meet any additional design criteria established by the Department of Public Works; and
3. Be placed as close together as possible to provide equally convenient access to users.

Owners or managers of food vendors and events must provide information and/or training for new tenants, employees, and contractors including janitors/laborers on how to source separate recyclables, compostables, and trash and must re-educate existing tenants, employees, and contractors at least once a year.

Food vendors that provide disposable food ware must have at least one container each for recyclables, compostables, and trash for use by customers and visitors, placed inside near a main exit, unless that vendor does not use disposable foodware for onsite consumption. Multiple food vendors that provide disposable food service ware and share a common eating area may share an appropriate number, size, and placement of containers for recyclables, compostables, and trash for convenient use by customers or visitors.

D. DRAFT POLICY – COMPOST PROCUREMENT POLICY

Below policy draft is based on NRDC and the Environmental Law Institute's Model Compost Procurement Policy.[447] The draft language appears as follows:

1. Purpose
    a. The City of Kingston, NY requires the procurement of compost (finished compost products) by Kingston City Departments and encourages the purchasing of compost by private entities, for use in projects where compost is a suitable material. By increasing the use of compost, the implementation of this policy will provide the following numerous benefits:

        i. Economic benefits
            1. Requiring the purchasing of compost can increase demand for compost and increase business for local compost suppliers.
            2. Diverting organic waste to be composted can reduce costs associated with landfill disposal.
            3. Growing the compost market may result in the development of new compost processing facilities, which in turn may provide more jobs.

[447] Darby Hoover, Model Compost Procurement Policy.

4. Applying compost increases soil-nutrient and water retention, which may reduce demand for irrigation and fertilizer, thereby reducing operational costs.

ii. Environmental benefits

1. Diverting organic waste from landfill disposal reduces greenhouse gas emissions by minimizing methane emissions from landfills and maximizing carbon storage from composting—and may ultimately mitigate the need for new landfill construction.
2. Cycling carbon and nutrients back into soil through compost application conserves resources and improves soil quality.
3. Composting helps prevent erosion and stabilize land.
4. Composting increases the ability of soil to retain water, thereby reducing stormwater runoff.
5. Reducing reliance on chemical fertilizers, which are often produced using fossil fuels, reduces water pollution that can result from fertilizer application and subsequent nutrient runoff.
6. Reducing reliance on irrigation conserves water resources.

b. The policy is not intended to supersede any existing federal, state, or local laws and regulations, including those that address materials procurement.

2. Municipal and state legal authority and policy support

a. Municipal: The City of Kingston's Climate Action Plan[448] requires reducing local greenhouse gas emissions by 50% by 2030, including an action to establish organic waste collection. One of the future actions is establishing systems that can advance organics collection. There are also strategies in the plan to sequester carbon through preservation and expansion of urban forest and increase local participation in community gardens, both of which are tangentially related to compost procurement.

b. Regional and State: Ulster County's Food Waste Prevention and Recovery Act requires large food scrap generators to separate food waste from the general waste stream and then gives options for what to do with it. One of the options is composting. In addition, starting in 2022, the New York State Food Donation and Food Scraps Recycling Law similarly requires large food scrap generators to donate or recycle their organics.

c. U.S. Environmental Protection Agency (EPA): EPA's Comprehensive Procurement Guideline recommends that relevant procuring agencies—including local agencies that have spent $10,000 or more on compost in the current or previous year, all or a portion of which came from federal funding—purchase compost made of recovered organic materials. The guideline recommends that procuring agencies "purchase or use mature compost made from recovered organic materials in such applications as landscaping, seeding of grass or other plants on roadsides and embankments, as nutritious mulch under trees and shrubs, and in erosion control and soil reclamation."

3. Definitions

a. "Compost" means solid waste that has undergone biological decomposition of organic matter, has been disinfected using composting or similar technologies, and has been stabilized to a degree

[448] "City of Kingston Climate Action Plan," City of Kingston.

that is potentially beneficial to plant growth and that is suitable for use as a soil amendment, artificial topsoil, or other similar applications.

b. "Composting" means biological decomposition of organic constituents under controlled conditions.

c. "Contract" means all types of City of Kingston agreements and contracts, regardless of what they may be called, for the procurement or disposal of supplies, materials, services, or construction.

d. "Contractor" means any person having a contract with the City of Kingston.

e. "Cost prohibitive" means the product purchasing cost exceeds by more than 10 percent the cost of another product that would serve the same purpose.

f. "Erosion" means the disintegration or wearing away of soil by the action of water.

g. "Green infrastructure" means an approach to wet-weather management that is cost-effective, sustainable, and environmentally friendly, and that incorporates management approaches and technologies that infiltrate, evapotranspire, capture, and reuse stormwater to maintain or restore natural hydrologies. Green infrastructure practices include, but are not limited to, open space, rain gardens, porous pavements, green roofs, infiltration planters, trees and tree boxes, swales, and curb extensions.

h. "Impervious surface" means any ground or structural surface that water cannot penetrate or through which water penetrates with great difficulty.

i. "Landfill" means a facility, other than a land application unit, where solid wastes are disposed of by burial in excavated pits or trenches or by placement on land and covering with soil or other approved material.

j. "Locally produced compost" means compost that is produced in the same region where it is being used.

k. "May" denotes the permissive.

l. "Private entity" means any person, business, or nonprofit that is not a government body or a contractor thereof.

m. "Procurement" means buying, purchasing, renting, leasing, or otherwise acquiring any supplies, materials, services, or construction. It also includes all functions that pertain to the obtaining of any supply, service, or construction, including description of requirements, selection and solicitation of sources, preparation and award of contract, and all phases of contract administration.

n. "Shall" denotes the imperative.

o. "Stormwater" means runoff that is generated from rain and snowmelt events that flow over land or impervious surfaces—such as paved streets, parking lots, and building rooftops—and does not soak into the ground.

p. "Top-dressing" is a method of adding compost, mulch, loam, peat, or a combination of these things as improvements to the soil or for leveling existing lawns.

4. Procurement requirements

   a. General policy

      i. City of Kingston Departments, except if otherwise exempted, shall purchase compost for use in public projects in which compost is an appropriate material, provided it is not cost prohibitive to acquire.

      ii. Private entities that are based or operate in the City of Kingston are also encouraged to purchase compost, when possible, for use in their applications.

iii. In conjunction with the overarching compost procurement requirement, compost shall be used to amend soil in landscaping and construction projects, as well as to provide for erosion control and stormwater management in road and highway and green infrastructure projects, in accordance with the requirements outlined in subsections 4.b. through 4.e. Compost used in landscaping, construction, roads and highways, and green infrastructure will count toward satisfaction of the compost procurement goals of the City of Kingston.

b. Landscaping

i. Using compost in landscaping projects improves the quality of soil and reduces the need for fertilizers and irrigation.

ii. Soil amendment prior to new planting

1. Prior to the installation of new plants in landscaping projects, City of Kingston Departments are required, and private entities are encouraged, to amend existing soil with compost. This requirement does not apply if soil tests reveal that pre-amendment soil is composed of at least 6 percent organic material to a depth of 6 or more inches, or a condition exists that prevents the application of compost, such as oversaturation.

2. Soil shall be amended with compost at a rate of at least 4 cubic yards of compost per 1,000 square feet of soil. The compost shall be spread evenly across the project area, then incorporated into the soil to a depth of 6 inches. In areas where there are not 6 inches of soil in which to incorporate the compost, compost shall be incorporated at a rate of 25 percent compost to 75 percent soil to the existing soil depth.

3. Proof of satisfactory soil quality that did not require amending, the condition that prevented application of compost, or the completion of the required soil amendment with compost shall be documented by the Department and made available for review by Purchasing Department upon request.

iii. Ongoing maintenance

1. City of Kingston Departments shall, and private entities are encouraged to, purchase and use compost, where feasible, in ongoing landscaping activities, such as for top-dressing.

c. Construction

i. In addition to providing benefits for post-construction landscaping, the use of compost to amend soil that is compacted or disturbed during construction projects increases on-site water retention, decreases erosion, and contributes to better stormwater management.

ii. The following measures shall be implemented in construction projects undertaken by the City of Kingston. It is encouraged, but not required, that the measures are adopted in the projects of private entities.

iii. Preserve existing soil

1. To the extent possible, Departments shall keep original soil in place and avoid compacting it with construction equipment.

2. When existing soil must be moved during construction, Departments shall keep it on-site for use once construction is completed.

iv. Post-construction soil standards and amendment

1. In areas where soil is left exposed after construction is completed (not impervious surfaces) and soil is being amended, Departments shall, and private entities are encouraged

to, amend the soil to achieve the organic matter and pH standards in the following subsection (4.c.iv.2). The soil shall be amended using compost.

2. Soil shall be amended such that the top eight inches contain between 5 and 10 percent organic material and are restored to their original pH levels, or to pH levels between 6 and 8. Five percent is sufficient for turf, and 10 percent is sufficient for planting beds. The amount of compost that will need to be added to achieve these standards will vary depending on the initial quality of the soil. Custom amendment rates specific to the soil for a particular project may be calculated using an online calculator from King County, Washington: https://kingcounty.gov/depts/dnrp/solid-waste/compost-calculator.aspx. Alternatively, the following preapproved amendment rates may be adopted:
    a. In turf areas, 1.75 inches of compost shall be incorporated into the top 8 inches of soil, which amounts to 5.4 cubic yards of compost per 1,000 square feet of soil; and
    b. In planting beds, 3 inches of compost shall be incorporated into the top 8 inches of soil, which amounts to 9.2 cubic yards of compost per 1,000 square feet of soil.
3. If soil is particularly compacted, the top 4 inches of the soil below the 8 inches of amended soil shall be scarified.
4. Compost shall only be incorporated into dry soil.
5. Proof of satisfactory soil quality that did not require amending, or of the completion of the required soil amendment with compost, shall be documented by Kingston Departments and made available for review by the Purchasing Department upon request.

d. Roads and highways

i. Compost is used in road and highway projects to prevent erosion, promote vegetation growth, and improve the stability and longevity of roads and highways.

ii. When undertaking erosion control measures in the context of road and highway construction and maintenance, Kingston Departments shall use compost where possible, including when implementing best management practices that call for the use of organic material. Measures for which compost
shall be used include, but are not limited to, the following:
    1. Landscaping and planting;
    2. Filter berms and socks; and
    3. Compost blankets.

iii. Kingston Departments should identify the appropriate organic material content, pH, and particle size for the intended use that compost should contain for landscaping and planting.[449]
    1. Filter berms, filter socks, and compost blankets: Ensure that compost adheres to the specific standards contained in the 2003 American Association of State Highway and Transportation Officials' Provisional Standards Manual for filter berms (applies to filter socks as well) and compost blankets.

iv. Satisfaction of the quality specifications for compost used in road and highway projects shall be documented by Kingston Departments and made available for review by Purchasing Department upon request.

[449] Literature review recommends a moisture content of 35-60%, particle size of less than 0.5 inches, soluble salts concentration of less than 4.0 mmhos/cm (ds/m), stability ranging from stable to very stable, and pH levels from 6.0 to 8.5.

e. Low-impact development and green infrastructure

i. Incorporating compost into low-impact development and green infrastructure projects can help achieve stormwater management goals by filtering pollutants and keeping more water on-site.

ii. When constructing low-impact development and green infrastructure projects, Kingston Departments, and private entities are encouraged to, use compost where possible, including when adopting best management practices that call for the use of organic material. Measures for which compost shall be used include, but are not limited to, the following:

1. Green roofs;
2. Downspout disconnections; and
3. Bioretention projects/rain gardens.

iii. Kingston Departments shall consult local policies and manuals for additional ways to incorporate compost into projects.

iv. The use of compost in low-impact development and green infrastructure projects shall be documented by Kingston Departments and made available for review by Purchasing Department upon request.

5. Compost sourcing and quality requirements

a. Locally produced compost

i. Compost purchased by Kingston Departments for purposes of complying with this policy shall be locally sourced.

ii. If locally produced compost is not available, compost shall be sourced from outside the region, with preference given to products sourced as close as possible to Ulster County. Proof that locally produced compost was not available at the time of purchase or was cost-prohibitive shall be documented—including, if appropriate, by written confirmation from local providers.

iii. Private entities are encouraged to purchase locally produced compost or compost from outside the region when it is available and not cost prohibitive.

b. U.S. Composting Council Seal of Testing Assurance (STA) Program certified compost

i. Kingston Departments shall, and private entities are encouraged to, purchase compost from U.S. Composting Council STA Program–certified compost manufacturers. Purchasers shall obtain technical data sheets from composting manufacturers detailing the test results for each compost shipment they receive. This information shall be kept on file and included in annual compost procurement reports.

6. Reporting

a. Kingston Departments shall compile annual reports, to be submitted to Purchasing Department on or before March 1, that contain the following information:

i. The name of the Department;

ii. The volume of compost purchased throughout the year and total funds expended on compost;

iii. Information about the source of the compost and proof of its STA certification;

iv. The end uses of the composted materials and proof of satisfaction of any quality specifications related to those uses;

v. The percentage of total materials purchased that consisted of composted materials; and

vi. Recommendations for how to increase the percentage of compost purchased in the future.

b. Kingston Purchasing Department shall review annual reports submitted by all Departments and track progress related to compost procurement throughout Kingston. This information will be made available to the public through regular reports on compost procurement and the state of composting in Kingston.

3. MUNICIPAL ORGANICS COLLECTION – PUBLIC MEETINGS

The City of Kingston is host to 24 distinct, city-appointed boards and commissions, as well as 27 different municipal departments, plus the Common Council. Boards and Commissions host meetings at regular intervals, often monthly, and typically open to the public; departments vary greatly in their meeting practices, some holding full department meetings regularly, others not. Additionally, it is common for special meetings to be held, such as project launch meetings, public information meetings, ad hoc advisory committee meetings, etc.

City meeting types, locations, duration, and style vary greatly. Due to the nature of public service, most board, commission, and Council meetings are considered "open meetings" and thus must be held in a public place and the date and location must be posted in advance. Internal staff meetings or department meetings do not fall under those guidelines and thus can take place in a staff office, or even a non-city location, though most meetings typically take place in municipal buildings.

A. JUSTIFICATION FOR COLLECTION

On occasion, municipal meetings, of all types, will include the offering of food of some sort, whether it is light snacks like fruit or nuts, or a whole spread of breakfast or a lunch. The presence of food at these meetings also then implies that disposal of food waste as well as serviceware, napkins, and cutlery will be needed. As the City of Kingston is developing a City-wide Organics Diversion Plan, it is imperative that organics collection spans all facets of municipal operations, including at municipal meetings. The transition to organics diversion at municipal meetings should be a relatively simple incorporation as the structure in which City meetings are held and the location in which most meetings take place lends itself to a logical system of diversion; the mechanism for collection will already be established for municipal building organics collection. Also, the dissemination of information about protocol will be streamlined as all municipal meetings are hosted by City staff or appointed officials. Thus, the likelihood of success should be high as the mechanisms are in place for the collection to be available. Though the volume of waste produced at municipal meetings is low, the key to a successful cultural shift, such as widespread implementation of organics diversion, is immersion of the practice in all facets of life, including home, work, and play.

B. MEETING STRUCTURE AND ORGANIZATION

The organizing of various types of municipal meetings is outlined in the following sections.

B.1. BOARD/COMMISSION AND COUNCIL MEETINGS

Either the Board, Commission or Council Chair or the Staff Liaison to the Board, Commission or Council, determines the date, time and location of the meeting, announces such to the Board / Commission / Council and then posts the date, time and location on the City's website for the public. The meetings

are organized and facilitated by the Chair or the Staff Liaison. The time and location of these meetings vary by Board/Commission but most commonly, Boards and Commissions meet in a public space in a conference room or meeting room, in a municipal building, such as:

- Kingston City Hall (most common)
- Andy Murphy Neighborhood Center
- Central Fire Station
- Kingston Police Department
- Everette Hodge Center
- Rondout Neighborhood Center
- Water Department

The Common Council always meets in City Hall. Some Board / Commission and Council meetings are held during the workday, but most are held in the evenings on weekdays. Meetings are rarely, if ever, held on weekends. Most Board / Commission and Council meetings are regular, recurring business meetings.

B.2. DEPARTMENT MEETINGS

Department Heads and/or City staff determine the date, time, and location of department meetings, and share that information with the relevant staff. These meetings are not publicly posted and are held within the workday, typically in the department workspace or office. Department meetings tend to be either team cadence, progress check-ins, one-on-ones, trainings, or strategy/planning meetings.

B.3. PUBLIC MEETINGS

Large and small public meetings take place dozens of times throughout the year and may take shape in the form of workshops, large group planning/brainstorming meetings, informational meetings, or project status update meetings. These meetings are typically planned weeks or months in advance, have a larger group of attendees including non-city staff, and vary in style, length, and location. Public meetings typically are organized by one or more City staff, who set the location, plan, and then host the meeting. These meetings are usually promoted broadly to the community and have diverse attendees. There are several common locations that public meetings are held, which include municipal buildings, as above, but also including non-municipal buildings such as the Kingston Library.

C. INFORMATION DISSEMINATION

To ensure successful implementation and sustainable practice for organics diversion at municipal meetings, the critical component is how information is disseminated. The process of disseminating information for meeting organizers needs to be established so that the implications of organics diversion are known and understood, but also do not place undue burden on the meeting organizer, especially as the meeting organizer already inherently has many details to coordinate and waste management should not add any excess strain to the situation, similarly with waste management in large events.

There should be a multi-pronged approach for disseminating information for organics diversion for municipal meetings. Note, this policy should also include the policy for organics diversion in municipal

buildings as a whole; the meetings component can be a sub-section. Recommended information dissemination formats are outlined in the following sections.

C.1. POLICY DOCUMENT

The protocol that all organic waste should be diverted and collected from all municipal meetings should first be established by the Administration. This sets the policy in place and demonstrates that the shift to organics diversion is a city-wide commitment. A policy should be written that states:

- Location of meeting (e.g., City Hall Conference Room 1, see list above)
- Items required to be composted (e.g., all organic food waste and paper products, both pre-serving and post-serving unless the pre-served food is to be saved or donated)
- Instructions that state the hierarchy of food waste management, 1) appropriate planning for quantities of food; 2) an individual plan for what to do with uneaten served food and unserved food that emphasizes saving or donation; and 3) that all wasted organics must be diverted to the proper waste receptacle
- If dishware, cutlery or napkins are to be used, then the mandate that they are BPI certified compostable should be instituted
- What the collection system looks like in each location (e.g., City Hall Conference Room 1: there will be a third bin (green) dedicated to organics recycling located in the conference room; all organics should be placed in the appropriate bin)
- Instructions that the meeting organizer should instruct the attendees what the waste management policy is
- Who to contact if there are any questions or concerns (e.g., If there are concerns or questions about composting at municipal meetings in City Hall, contact the Sustainability Coordinator at julielnoble@kingston-ny.gov or by phone at 845-481-7339)

Each location which hosts municipal meetings should be listed in the policy, with specific instructions for each site.

C.2. BROADCAST COMMUNICATION

Once the meeting solid waste management policy is written, the Mayor should distribute this policy to all staff, department heads, board and commission chairs and members, and Common Council members directly with a directive that this will go into effect immediately and is part of the City's new solid waste management procedures.

C.3. SENIOR STAFF MEETING

Once the policy is written, the Mayor and/or Sustainability Coordinator should review the new policy with all Senior Staff at a Senior Staff Meeting, at Kingston City Hall Conference Room 1, where food is offered, so that the practice can be shown by example in a space where most City meetings are held.

C.4. WEBSITE UPDATE

The meeting solid waste management policy should be posted on the City's website and in the General Shared Folder of the City's internal file network.

C.5. FACILITY RESERVATION SYSTEM NOTICE

The policy should be included in any online meeting reservation system that the City currently uses or implements in the future.

D. FOOD WASTE / ORGANICS COLLECTION

The key to successful collection with minimal contamination at municipal meetings is signage. Similarly, to organics collection at events, until composting is more universally instituted, many attendees will be unfamiliar with both the process and also what is and what is not compostable. Simple, clear, color images and signage[450] are the most effective for communicating to attendees, when they need to make a decision about which bin to place their waste. Since serviceware, napkins and cutlery will also be composted, it is critical that signage also includes images of those items in addition to common food items.

Collection at each location which hosts municipal meetings should be uniform. There should be three unique bins EITHER of three different colors or all of the same color is acceptable, but all three must be clearly labeled as to their contents: Recyclables, Food Scraps, Trash, or similar. Bins should be placed in a clear location, all together, so that attendees have one station to visit to simplify collection.

Once the meeting is over, the meeting organizer should ensure the remains of any food scraps and/or serviceware are properly stored or disposed. Removal and disposal of the solid waste bins is not the responsibility of the meeting organizer.

Since a third bin does not currently exist at the meeting locations, the locations of all meeting spaces must be included in the bulk purchase that is made to outfit the remaining buildings with organics bins, before this policy is set in place. If the bulk purchase does not intend to include individual bins per office for that particular building, then when the inventory of rooms is being conducted to outfit the building with proper collection bins, each room which could host a meeting should be included in the inventory, necessitating its own dedicated bin.

E. DISPOSAL OF ORGANIC WASTE

The benefit of organics diversion at municipal meetings in municipal buildings is that there is already a system in place for disposal of recyclables and refuse in the same spaces. Depending on the site, either the Night Cleaner or a Laborer manages the solid waste for that space. With the addition of organics collection at meetings, the same person will be responsible for removal of the organic waste, on the same schedule in which they remove and dispose of the other two waste streams, daily. In each municipal meeting location that is within a municipal building, there will be a consolidated central location which is designated specifically for temporary storage of the organic waste until it is collected from the building. The maintenance staff responsible for removing the solid waste from each room of the building will do so for the organic waste as well. Proper handling and cleaning of the bins will be in the same manner as the existing recycling and refuse bins are cleaned and handled.

[450] "Rebusiness Partners", Recycle Tompkins, https://recycletompkins.org/other-programs-and-services/rebusiness-partners/. Accessed March 14, 2023.

For municipal meetings that take place in non-municipal buildings, the policy should remain in effect, though the practice may vary slightly. For any meeting that takes place outside of municipal property, the policy should reflect that the meeting organizer should inquire with the facility hosting the meeting about their solid waste management policy and set up. Every effort should be made to ensure the greatest diversion of waste possible considering the circumstances at each site, including reduction in waste produced, saving, and donating of any extra food, and, if feasible, removal of organic waste from the site by the organizer to a separate disposal identified as part of the City's potential organics diversion program.

4. MUNICIPAL TRACKING OF ORGANICS WASTE COLLECTION

With minor modifications, the City of Kingston's current waste tracking methodology for refuse and recycling will be used to track the amount of organics diverted from the waste stream if curbside organics collection is implemented. The proposed organics collection tracking methodology will be most useful if the City is hauling the organics themselves to the processor, rather than an outside vendor. If an outside vendor is chosen, the City should consider writing into the RFP and contract with the hauler for a system for tracking the amount of organics diverted from the waste stream. Table 64. Organic Collection Tracker sample shows a sample tracking sheet with sample entries through a partial April run.

The City tracks waste by weighing each truck or packer at UCRRA as it drops off refuse or recycling collected. The date and time of the delivery and the weight are noted in a spreadsheet. The spreadsheet has a daily subtotal section since the same truck will sometimes make two trips to UCRRA in one day. The same delivery and weighing process will occur at whichever compost processor the City of Kingston chooses. Considering that the organics program will be in pilot form and may require additional tracking, the template tracking methodology also includes formulas to assist the City in tracking the amount of organics diverted each month, as well as the average daily and monthly diversion.

Table 64. Organic Collection Tracker

	Packer 2			Packer 3			Packer 4			Packer 5			Packer 6			Packer 7			Packer 8			Packer 9			Packer 10			Packer 11			TOTALS
Monthly Totals																														
January			35.72			41.93			18.71			0.00			0.00			14.28			0.00			0.00			6.52			0.00	117.16
February			34.68			35.77			0.00			8.99			3.52			17.42			0.00			0.00			15.77			0.00	116.15
March			34.46			30.05			13.67			0			10.7			17.54			8.16			0			1.18			0	115.76
April			2.63			5.38			0			0			3.68			5.85			0			0			0			0.59	18.13
Avg. Monthly Tons			26.87			28.28			8.10			2.25			4.48			13.77			2.04			0.00			5.87			0.15	91.80
Avg. Daily Tons			2.91			4.35			5.40			4.50			2.24			3.67			2.72			#DIV/0!			2.93			0.59	8.54
Total Annual Tons			107.49			113.13			32.38			8.99			17.90			55.09			8.16			0.00			23.47			0.59	367.20
Highest Daily Tons			**6.87**			**10.37**			**6.43**			**4.63**			**3.52**			**6.44**			**3.82**			**0.00**			**4.69**			**0.59**	
Collections Count			41			31			6			2			8			16			3			0			8			1	
Days Collected			37			26			6			2			8			15			3			0			8			1	
Collection Days			43																											

	Packer 2			Packer 3			Packer 4			Packer 5			Packer 6			Packer 7			Packer 8			Packer 9			Packer 10			Packer 11			
Date	**Time**	**TONS**	**Daily Subtotal**	**Time**	**TONS**	**Daily Subtotal**	**Time**	**TONS**	**Daily Subtotal**	**Time**	**TONS**	**Daily Subtotal**	**Time**	**TONS**	**Daily Subtotal**	**Time**	**TONS**	**Daily Subtotal**	**Time**	**TONS**	**Daily Subtotal**	**Time**	**TONS**	**Daily Subtotal**	**Time**	**TONS**	**Daily Subtotal**	**Time**	**TONS**	**Daily Subtotal**	**TOTALS:**
1/2	12:22	1.52	**1.52**	7:57	5.75	**5.75**																			12:42	2.70	**2.70**				9.97
1/3	2:16	1.06	**1.06**																												1.06
1/7	12:18	3.46		1:08	6.11																										
	2:38	1.83	**5.29**			**6.11**																									11.40
1/8	1:51	4.35	**4.35**	9:59	3.68	**3.68**	1:58	6.43	**6.43**																7:26	3.47	**3.47**				17.93
1/9	1:01	2.33		7:57	6.26		2:07	6.28																							
			2.33	2:18	4.11	**10.37**			**6.28**																						18.98
1/10	2:24	3.20	**3.20**	1:57	4.44	**4.44**	1:57	6.00	**6.00**																						13.64
1/11	1:38	3.20	**3.20**																						1:51	0.35	**0.35**				3.55
1/15	11:10	1.75	**1.75**																												1.75
1/16	1:43	0.64	**0.64**																												0.64
1/22	2:06	3.49	**3.49**	1:34	3.78	**3.78**										1:52	3.89	**3.89**													11.16
1/24	1:58	3.47	**3.47**	1:22	3.85	**3.85**										1:16	5.26	**5.26**													12.58
1/25	2:12	2.82	**2.82**	1:48	3.95	**3.95**										1:24	5.13	**5.13**													11.90
1/29	1:40	2.18	**2.18**																												2.18
1/31	11:13	0.42	**0.42**																												0.42

2/4	2:18	4.31	**4.31**	2:03	4.29	**4.29**										1:43	5.5	**5.50**												14.10
2/5	12:49	5.26	**5.26**	2:04	5.85	**5.85**																			2:18	4.69	**4.69**				15.80
2/6	12:25	2.02	**2.02**	1:36	4.24	**4.24**										1:51	6.44	**6.44**							1:45	3.97	**3.97**				16.67
2/7				1:44	3.99	**3.99**										12:58	5.48	**5.48**							2:03	3.28	**3.28**				12.75
2/12	12:16	2.11	**2.11**																												2.11
2/19	1:51	3.96	**3.96**	1:44	4.85	**4.85**																			1:51	3.83	**3.83**				12.64
2/20	11:29	5.17													2:15	3.52															
	2:25	1.16	**6.33**														**3.52**														9.85
2/21	1:41	4.81		8:36	5.31					1:54	4.63																				
			4.81	2:03	2.95	**8.26**						**4.63**																			17.70
2/22	2:08	3.55	**3.55**	2:05	4.29	**4.29**				2:00	4.36	**4.36**																			12.20
2/25	11:30	0.58	**0.58**																												0.58
2/26	12:24	1.24	**1.24**																												1.24
2/27	11:02	0.51	**0.51**																												0.51
3/4	1:49	4.87	**4.87**	1:48	4.88	**4.88**									2:02	1.96	**1.96**														11.71
3/5	12:22	4.69		1:41	4.83		1:21	4.89																							
	1:15	0.8	**5.49**			**4.83**			**4.89**																						15.21
3/6	2:15	4.44	**4.44**	1:36	3.9	**3.9**	1:25	4.83	**4.83**																						13.17
3/7				1:37	2.62	**2.62**	1:49	3.95	**3.95**										2:46	1.99	**1.99**										8.56
3/8															12:45	1.76	**1.76**								1:29	1.18	**1.18**				2.94
3/12															1:37	2.97	**2.97**	10:00	3.11	**3.11**	1:38	2.35	**2.35**								8.43
3/13															12:38	0.73	**0.73**														0.73
3/18	1:43	4.1	**4.1**															1:44	4.69	**4.69**											8.79
3/19	12:23	4.78	**4.78**	1:56	5.92	**5.92**												10:47	2.89	**2.89**											13.59
3/20	7:42	2.59																													
	2:23	4.28	**6.87**																												6.87
3/21	2:27	3.1	**3.1**	7:25	5.02	**5.02**												7:26	3.67	**3.67**											11.79
3/22	12:46	0.24	**0.24**	11:11	2.88	**2.88**									10:54	3.28	**3.28**	12:47	3.18	**3.18**	9:56	3.82	**3.82**								13.40
3/27	1:54	0.57	**0.57**																												0.57
4/1				1:03	1.2	**1.2**												1:03	1.26	**1.26**									1:37	0.59	**0.59**	3.05
4/2	7:25	0.49		7:26	0.56										7:41	1.71		7:28	1.04												
				7:27	0.56													12:35	1.24												
			0.49	12:41	1.16	**2.28**											**1.71**			**2.28**											6.76
4/3	11:46	1.79		7:26	0.56													1:53	1.04												
			1.79	1:53	1.04	**1.6**														**1.04**											4.43
4/4	7:26	0.35	**0.35**	7:27	0.3	**0.3**									7:39	1.97	**1.97**	12:53	1.27	**1.27**											3.89

5. RESIDENTIAL BIN DISTRIBUTION PLAN

This section begins by outlining the City's current curbside waste collection services, the City's transition to dual stream recycling, and the collection analysis of the City's 2019 recycling tote volume. Lessons learned from this transition informed bin distribution options for an implemented organics diversion program.

A. KINGSTON CURBSIDE WASTE COLLECTION SERVICE

As detailed in "Kingston Municipal Solid Waste", the City provides curbside collection of refuse and dual-stream recycling to over 6,600 customers, including single and multi-family properties as well as some businesses as part of the services covered in City taxes.[451] All City residential customers served by City refuse collection service are provided curbside totes, with multi-family property owners paying $450 annually for one or more additional refuse totes; additional recycling totes for these properties are provided at no cost. Business customers served by City refuse collection are either provided City-issued totes, or place refuse curbside in bags and recycling in their own totes, depending on the location; those businesses not provided refuse collection by the City contract with private haulers.

The City provides weekly refuse collection and alternating weekly dual stream recycling collection, with single-day weekly collection provided for customers Mondays through Thursdays year-round. The City switched from single stream to dual stream recycling in April 2019. The need for this change, stated on the City's recycling webpage, was "due to a mandate from the Ulster County Resource Recovery Agency, our disposal site, based on tighter restrictions and changing demands of recycled materials".

The City also provides curbside yard waste collection on an alternating weekly collection schedule seasonally, from April to October. The yard waste and brush collected includes grass clippings, leaves, garden debris, and small chipped branches (these must be containerized or in a bio-degradable bag); tree pruning, shrubs, and large branches; and branches no larger than four feet in length and with a three-inch diameter or smaller. Yard waste cannot be put in customer's brown refuse totes. Yard waste is transported to the City transfer station (which is open Fridays 9am-1pm and Saturdays 8am-3pm year-round) and is not weighed or recorded. City residents may also drop off leaf and yard waste at the transfer station year-round at no charge. Additionally, the City provides dedicated leaf and brush collection in the fall and Christmas tree collection in January.

The current status of refuse collection for all City customers is as follows:

- Trash: Weekly collection, brown totes.
- Recycling – Paper and Cardboard ONLY: Alternating weekly collection; blue totes with yellow lid (pizza boxes are not accepted, as they are wax coated and also may be contaminated with food).
- Recycling – Glass, Plastic and Metal ONLY: Alternating weekly collection, blue totes with blue lids.
- Yard Waste: Alternating weekly collection, seasonal (April-October), no totes provided.

[451] "Recycling", Kingston, NY, February 2020, https://www.kingston-ny.gov/recycle.

A.1. TRANSITION TO DUAL STREAM RECYCLING

As part of the transition to dual stream recycling collection, the City distributed over 6,000 totes to City residential customers between March and April 2019. In April the switch to dual stream recycling was implemented, with separate paper and commingled glass/plastics collection reduced to an alternating-week collection schedule at that time (previously single stream recycling was collected weekly along with refuse). This change also required the addition of a second curbside recycling tote to separate the dual stream recycling, as well as for a new color-coded lid to be placed on all the original single stream recycling totes.

A mailer outlining the changes and containing the new collection calendar and schedule was sent to all City customers via U.S. Postal Service mail, with a separate recycling flyer mailed out as well, depicting all materials to be recycled and in which tote. The new totes and the new lids (which were installed on the original recycling totes at the time when the new totes were delivered) also depict which items to recycle in which tote. The City hosted an information session on March 21, 2019, at City Hall explaining the new recycling program, and video of the event is posted on the City's recycling website (Recycling Transition Informational Meeting, 2019).

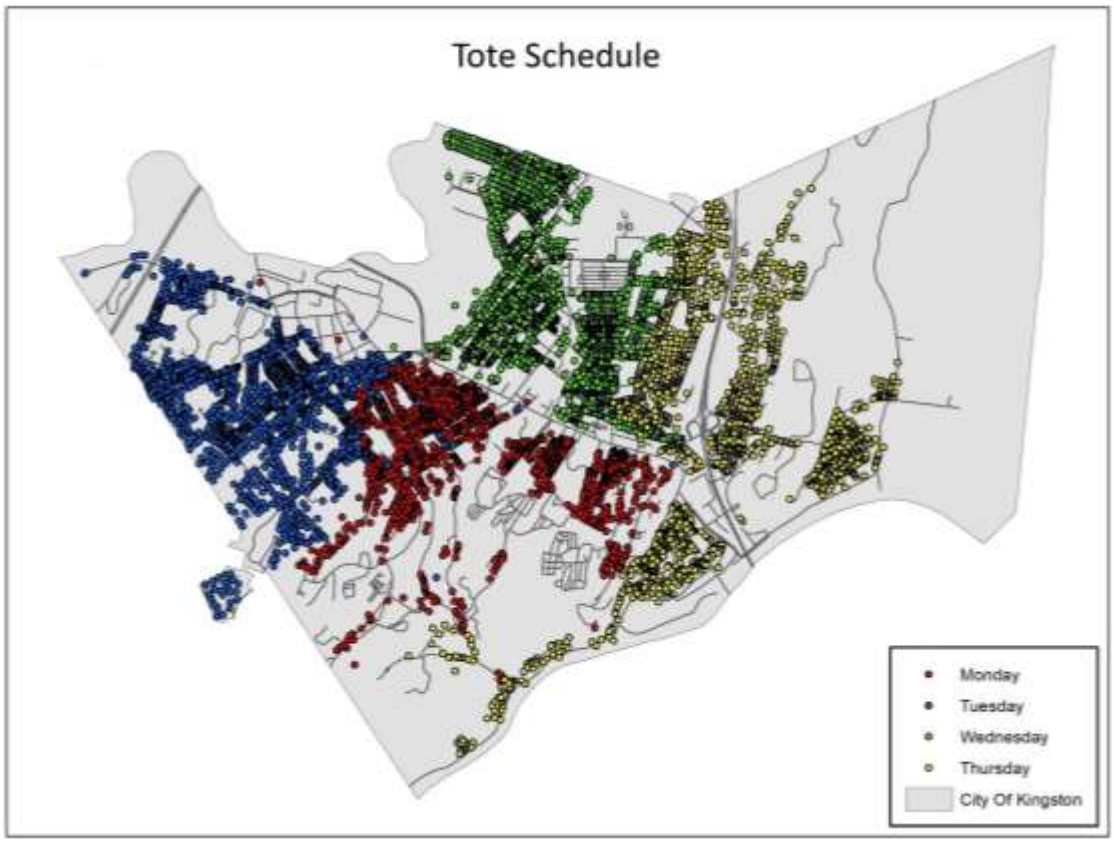

Figure 79. City of Kingston Tote Schedule.

All of the individual residential addresses for which the City provides refuse collection are indicated on the City's internal tote schedule map shown in Figure 79. City of Kingston Tote Schedule. These addresses represent the addresses to which totes and new lids were distributed as part of the transition to dual stream recycling.

Approximately two thirds of the totes distributed to customers were 96 gallons in size, with the remaining approximately one third receiving 64-gallon totes. Additionally, a limited number of 32-gallon totes were distributed – under 50 citywide – as these are optional upon request, but their availability is not advertised.

A.2. 2019 RECYCLING TOTE VOLUME COLLECTION ANALYSIS

The City completed a recycling tote volume collection analysis in fall 2019. These data were collected to help determine the potential for reduced collection frequency for recycling. For the evaluation, there were several trends and anecdotal notes that were made:

Paper/Cardboard

- For Monday Paper/Cardboard Recycling Collection, there were mostly only 100% or 0% volumes placed curbside.
- There were many totes placed curbside that at first glance were 100% but were really just one or two full cardboard boxes; if those boxes would have been compacted, the volume would have really been 25-75%.
- If there was a longer time between collection, people would be forced to compact cardboard which many didn't.

Glass, Plastic & Metal

- There were more full totes in Midtown than other places, which could be a function of multifamily units or larger families in the area, thus filling totes more.
- Many Monday and Thursday totes were not out.
- Monday collection showed a significant amount of contamination – refuse, cardboard, plastic bags, buckets.

Based on analysis of the data, as well as anecdotal and institutional knowledge of the solid waste management operation, the following were recommendations for future recycling collection for the City of Kingston:

- This evaluation was completed after 6 months of transition. **It is recommended to reevaluate in another 6 months to one year without making any changes to the schedule** so that the community has time to adjust and the DPW has time to do more education.
- Continue with the **increased level of education and communication** with the public on proper compliance including:
    - Encourage residents to wait until tote is full to roll to curbside.
    - Encourage residents to compact cardboard boxes to accommodate more volume.
    - Reinforce the list of materials that are not accepted to reduce contamination.
    - Continue the warning system of alerting residents of which contaminant they included.
    - Institute the fee system for violations after warnings.
    - Issue the 2020 Recycling and Refuse Calendar along with an updated Fridge Flyer to all residents.
    - Update the recycling website and keep updated.
    - Consolidate Tote Distribution Lists to have one comprehensive list of all solid waste totes distributed in City.

- Host a public meeting in the Spring to reiterate Recycling Rules and Regulation.

B. BIN DISTRIBUTION PLANS

Considering that the City of Kingston recently implemented significant changes in the waste collection services it provides for customers, it faces a unique set of considerations in distributing bins for a successful organics diversion program. The recent changes included shifting from single stream to dual stream recycling, which required the addition of a third tote for customers; the more than 6,900 totes purchased and distributed in March/April 2019 cost the City approximately $315,719. With the current dual stream recycling program, paper/cardboard and commingled recycling are now on an alternating-weekly collection schedule, with refuse collection remaining on a weekly schedule.

With the shift to two curbside recycling totes and an alternating-weekly recycling collection schedule, color-coded lids and a corresponding color-coded recycling calendar were also distributed to City customers to help avoid confusion. Additionally, as most customers now have three large 96-gallon totes onsite outside, the availability of outside storage space for any additional totes will need to be taken into consideration as well. The following recommendations include these factors.

The bin distribution plan options below outline how Kingston can choose the bins it will distribute to residents, decide what to charge for those bins, and decide how many to buy, depending on how the program is being implemented. This section also covers how Kingston may educate residents about how to effectively use the bins.

B.1. BIN DISTRIBUTION FOR PHASE 2 OF KINGSTON'S ORGANICS DIVERSION PROGRAM

Deciding how Kingston will distribute bins is dependent on whether the City will pursue a pilot program where residences and businesses along a single day waste collection route are part of the pilot program, or begin an opt-in program offering organics diversion to everyone in the City who would like to participate. Many communities start with pilots for good reason – pilots are a good way to build the case for a larger program. However, many communities have also implemented opt-in programs where anyone in the community who is interested can sign up for curbside organics collection. Details of how Kingston would implement both programs are in the "Phased Implementation" section. Whether the City pursues a pilot first or goes straight to an opt-in program, the following considerations apply related to bin distribution.

1. COMMUNICATIONS WITH PARTICIPANTS

It is recommended that Kingston maintain communications with participants throughout the distribution of the bins. This may include regular emails and surveys, phone calls, and site visits to provide education and updates and to collect participants' feedback and determine best practices, etc. Also, as was the case in the roll out of dual stream recycling, a dedicated email, and phone number should be established for residents and businesses to get additional information.

2. STARTER KITS

The City may choose to provide free or reasonably priced starter kits to participants, to include:

- For residential customers: 2-gallon kitchen collectors and compostable bags, an educational flyer, and a curbside tote locking lid (with organics label and information on lid). Descriptions of various pieces of the starter kit by brand are available in this Study's Appendices, Appendix F. Bins, Liners, & Totes. The size of the curbside tote depends on whether yard waste is included in the program, as well as the building being serviced. For single family residences without yard waste included, a 12-gallon curbside tote may suffice. For multifamily properties, a 64-gallon curbside tote is recommended. Customers could also choose which bin size they would prefer. If yard waste is collected as part of the program, a 34/64-gallon curbside tote with locking lid (with organics label and information on lid) for single family properties or 64-/96-gallon curbside totes with locking lid (with organics label and information on lid) for multifamily properties may suffice. Additionally, smaller 12- or 21-gallon cart options could be offered to those customers that do not produce much yard waste.
- For business customers: Educational flyer(s), and 64/96-gallon curbside totes with locking lids (with organics label and information on lid) should suffice. It may be helpful to conduct onsite staff training(s) in advance of the opt-in program launch (Phase 1) if there is interest and a need for it. The opportunity for businesses to participate in the opt-in program (for food waste only) may be limited depending on the collection mechanism/collection truck used. Only automated-loader garbage trucks would be able to accommodate the weight of full large-sized organics totes. For example, for their pilot program Cambridge used a manual-loading DPW 20 cubic yard packer truck for the residential food waste program, with smaller 12- or 21-gallon organics totes used by their customers. Sizing of indoor collection bins and curbside totes for businesses to participate in the opt-in program will require flexibility for the business' physical layout and perhaps should be handled on a case-by-case basis. No community showcased in Appendix H. Case Studies provides indoor collection bins for business customers.

3. COSTS AND SUBSIDIZATION

The costs of the starter kits are dependent on the number of each component of the kit, as well as the size of the curbside bins, which will affect the pricing of the curbside bins. Bulk purchasing will reduce their costs.

4. DISTRIBUTION

Municipalities have various ways of getting bins to residents, dependent on the cost. As seen in Appendix H. Case Studies, Scarsdale has a website where residents can purchase the starter kit to be picked up at the sanitation department. Minneapolis and Cambridge have websites where a free bin can be requested for delivery. Either method – pickup at a municipal location or delivery to the residence – can be utilized with or without an online payment system.

5. RESIDENTIAL PHASE 2 COSTS

The Phase 2 residential costs vary depending on whether the City allows yard waste in the curbside organics tote. It should be noted that Kingston could subsidize the cost of the starter kits (kitchen collector, three weeks of bin liners for the kitchen collector, and curbside cart) or sell it at cost to residents, as was the practice with the Village of Scarsdale. The City could also subsidize part of the cost for the curbside bin and sell the remainder at cost (kitchen bin and liners).

For the estimated 884 residences, a mix of mostly single-family residences with some multi-family housing, not including yard waste, the total costs would be around $45,000; this estimate excludes an estimated delivery cost of $3.85 per unit, which would add approximately $3,400.00 to the total. This includes residential kitchen collectors and single-use liners for all, 684 12-gallon curbside totes, and 200 64-gallon curbside totes for multi-families and businesses. See Table 65. Phase 2 Costs – No Yard Waste.

Table 65. Phase 2 Costs – No Yard Waste

Product Type	Item	Total Product Cost	# of Units	Notes
Kitchen Collector Bin Liners	Norpro	$1,989.00	884	Provides 3-week supply.
Kitchen Collector	Sure Close Kitchen Scrap Collection Pail	$9,061.00	884	
Curbside Cart	Orbis NPL 280	$23,081.58	684	12 gal
Curbside Cart	Cascade Engineering Cart (M)	$10,972.00	200	64 gal
Total Costs: Phase 2 Costs – No Yard Waste		**$45,103.58**		

With a 34-gallon being the smallest size curbside bin to accommodate some yard waste, the costs increase to around $55,000; this estimate excludes the estimated delivery cost of approximately $3,400.00. See Table 66. Phase 2 Costs – With Yard Waste.

Table 66. Phase 2 Costs – With Yard Waste

Product Type	Item	Total Product Cost	# of Units	Notes
Kitchen Collector Bin Liners	Norpro	$1,989.00	884	Provides 3-week supply.
Kitchen Collector	Sure Close Kitchen Scrap Collection Pail	$9,061.00	884	
Curbside Cart	Cascade Engineering Cart (S)	$32,052.24	684	34 gal
Curbside Cart	Cascade Engineering Cart (M)	$10,972.00	200	64 gal
Total Costs: Phase 2 Costs – With Yard Waste		**$54,074.24**		

7. BACKYARD BINS

Kingston may also want to consider distributing backyard compost bins as part of its distribution of the starter kits. Promoting backyard composting is cost efficient as the City will not be responsible for hauling the food scraps and ensuring they are transformed into a usable product. Backyard composting generally does not accept as many materials as commercial composting, therefore residents could feasibly do both backyard composting and use the City's program for materials such as meat, grains, and compostable products. Care must be given in explaining to residents the difference

between putting food scraps in a backyard bin compared to in a curbside bin or at a drop off location. Backyard composting is more of a commitment than curbside or drop off composting and requires knowledge of how to compost effectively without creating a smell or encouraging pests. Varieties and brands of backyard compost bins available for sale are listed in "Residential Composting Technologies".

The City can decide to subsidize the cost of these backyard bins or not. Ulster County sells subsidized compost bins and rain barrels to residents. Residents must pick up their bins from the UCRRA office during a single day event. No matter the cost of the bins, educational materials and troubleshooting help should be provided, but making the bins free or deeply discounted may mean bins are distributed that go unused, which is not ideal nor cost effective for the City of Kingston. A pre-order process would ensure the City does not end up with unsold bins. Additional surveying of and education for those residents that purchased or received a bin to see how often they are using it and if they need any assistance could ensure the City understands the impact the bins are having on the City's waste stream.

B.2. BIN DISTRIBUTION FOR ORGANICS DIVERSION MANDATE

After Phase 2, Kingston may consider creating a residential ordinance mandating organics diversion in Phase 3. This would entail purchasing and distributing bins for every household in Kingston and businesses served by Kingston DPW. The following are considerations related to a mandated organics diversion program.

1. EDUCATION AND OUTREACH

The education and outreach for the mandate should pull from best practices found in Appendix H. Case Studies. It should build on the work Kingston has already done for the transition to dual-stream recycling and organically grow from the outreach and education materials created for the opt-in or pilot program. The City may consider hiring a designer to create collateral materials that assist residents and businesses in effectively sorting their waste.

2. COSTS AND SUBSIDIZATION

The costs for buying bins for the remaining residences not served by Phase 2 would be approximately $278,000 if residential customers received smaller totes that did not accommodate yard waste (estimating 5,000 12-gallon totes and 765 34-gallon totes). If customers received larger bins for yard waste (estimating 5,000 34-gallon totes and 765 64-gallon totes) the costs would be around $348,000. Both these estimates exclude estimated delivery cost of approximately $22,000. See Table 67. Phase 3 Costs – No Yard Waste and Table 68. Phase 3 Costs – With Yard Waste. It should be noted that while the City has not charged residents in the past for new types of bins, the City could initiate a PAYT model in which residents pay a fee based on the size of tote used for refuse / food waste / recycling.

Table 67. Phase 3 Costs – No Yard Waste

Product Type	Item	Total Product Cost	# of Units	Notes
Kitchen Collector Bin Liners	Norpro	$12,971.25	5,765	Provides 3-week supply.
Kitchen Collector	Sure Close Kitchen Scrap Collection Pail	$59,091.25	5,765	
Curbside Cart	Orbis NPL 280	$168,725.00	5,000	12 gal
Curbside Cart	Cascade Engineering Cart (S)	$37,377.90	765	34 gal
Total Costs: Phase 3 Costs – No Yard Waste		**$278,165.40**		

Table 68. Phase 2 Costs – With Yard Waste

Product Type	Item	Total Product Cost	# of Units	Notes
Kitchen Collector Bin Liners	Norpro	$12,971.25	5,765	Provides 3-week supply.
Kitchen Collector	Sure Close Kitchen Scrap Collection Pail	$59,091.25	5,765	
Curbside Cart	Cascade Engineering Cart (S)	$234,300.00	5,000	34 gal
Curbside Cart	Cascade Engineering Cart (M)	$41,967.90	765	64 gal
Total Costs: Phase 3 Costs – With Yard Waste		**$348,330.40**		

FUNDING OPPORTUNITIES

The grants listed here cover New York State and federal composting and waste reduction funding opportunities, for municipalities, businesses, and schools. Some of NYS DEC Grants for Waste Reduction and Prevention can be applied to signage, bins, and communications efforts that would be useful in encouraging and providing the tools for residential household participation in food waste diversion.

All grant opportunities listed in this section, "Grant Funding Table", have been selected for their provision of significant and useful funding. Eligible applicants for these programs are the entity with management authority, such as the City, individual businesses, or the Kingston City School District.

The City's promotional materials for businesses would benefit from incorporation of grant opportunities from the NYS P2I, Agriculture and Food Research Initiative (AFRI), and Small Business Innovation Research (SBIR) grants. Ensuring that Kingston schools are aware of the grant opportunities through the NYS Green School Grant Program would also be beneficial.

The City can benefit from regularly consulting the variety of grants available from the NYS Department of Environmental Conservation (NYS DEC) Grants for Waste Reduction and Recycling, the United States Department of Agriculture (USDA) Community Composting and Food Waste Reduction Grants, and the U.S. EPA website. With the exception of those grant opportunities with recurring cyclical application cycles, many grant opportunities have short application timelines.

1. NYS DEC

NYS DEC offers a number of 50/50 matching grants related to composting and recycling. First, the Climate Smart Communities Implementation Grants[452] provide funding for non-power sector GHG mitigation or climate change adaptation projects, with a minimum award of $50,000 and a maximum award of $2,000,000 (funding awards based on the 2021 Consolidated Funding Application cycle). Second, the NYS DEC offers Grants for Waste Reduction and Prevention as well as Recycling Coordination and Education Projects[453] are designed to assist municipalities with expanding or improving local waste reduction and recycling; eligible costs include recycling coordination, education, planning, and promotion. Within that same Waste Reduction and Prevention Program, there is funding available under Recycling Capital Projects[454] for capital costs of materials recycling and composting facilities, recycling/composting containers and totes, and purchasing of new recyclables collection vehicles.

[452] "Grant Funding for Municipalities", NYS Dept. of Environmental Conservation.

[453]"Grants for Waste Reduction and Prevention Projects", NYS Dept. of Environmental Conservation.

[454] "Grants for Waste Reduction and Prevention Projects", NYS Dept. of Environmental Conservation.

2. NYS POLLUTION PREVENTION INSTITUTE

Within NYS DEC, NYS P2I[455] awards funding to projects that seek to improve the health, environmental quality, and economic vitality of communities across NYS. NYS P2I has funded a composting project with the Adirondack North Country Association. NYS P21 also provides reimbursement to NYS businesses or nonprofits[456] that generate, haul, or recycle large amounts of food waste to offset the cost of select technologies and equipment that promise to reduce landfilled or incinerated food waste. This reimbursement program will fund up to 44% of eligible project costs, in most cases not to exceed $100,000.

3. NYS GREEN SCHOOL GRANT PROGRAM

The New York Green School Grant Program,[457] funded by the NYS Association for Reduction, Reuse and Recycling (NYSAR3), established a grant program for public and private schools Grades K-12 in 2005 to provide start-up money for recycling and waste reduction programs in public and private schools. The funds from the Program can be combined with other sources of funding to conduct public education around composting. Funding awarded is up to $1,000 per project.

4. US EPA ANAEROBIC DIGESTION CAPACITY AND SUSTAINABLE MATERIALS MANAGEMENT GRANTS

The US EPA has offered grant opportunities for states, tribes, territories, and non-profit organizations to help reduce food loss and waste, and divert food waste from landfills by supporting anaerobic digestion capacity[458] in the United States. Though current deadlines have passed, presumably the Program may reopen with future opportunities. The EPA Region 2 Sustainable Materials Management Grants[459], which awarded $150,000 for up to three grants, sought applications for regional projects that addressed sustainable food management in Region 2 (includes New York).[460] Though the previous round of this grant was focused on Region 3, the grant opportunity may be renewed in Region 2 in the future.

[455] "Funding", NYS P2I, https://www.rit.edu/affiliate/nysp2i/funding. Accessed November 2021.

[456] "Food Waste Reduction and Diversion Reimbursement Program", NYS P21, https://www.rit.edu/affiliate/nysp2i/collaborations. Accessed November 2021.

[457] "Green School Grant Program", https://www.nysar3.org/page/green-school-grant-program-16.html. Accessed November 8th, 2021.

[458] "Funding Opportunities and EPA Programs Related to the Food System", OLEM US EPA, https://www.epa.gov/sustainable-management-food/funding-opportunities-and-epa-programs-related-food-system. Accessed November 8th, 2021.

[459] Ibid.

[460] EPA Region 2 serves New York, New Jersey, Puerto Rico, the Virgin Islands and 8 Indian Nations. OA US EPA, "EPA Region 2," https://www.epa.gov/aboutepa/epa-region-2 Accessed November 5th, 2021.

5. USDA COMMUNITY COMPOST AND FOOD WASTE REDUCTION GRANTS

The USDA offers Community Compost and Food Waste Reduction[461] grants to support projects that develop and test strategies for implementing municipal composting and food waste reduction plans in urban areas and suburbs. These grants fund some capital costs, including purchase, lease or rental of special purchase equipment, vehicles, land and building space; contractual costs, such as for consultants and engineering firm; and construction costs for building permanent or non-permanent movable structures, and activities that encourage composting. The per unit cost of each supply item requested in the project budget must be below $5,000; and only special purpose equipment (equipment for research, medical, scientific, or other technical activity) is eligible as equipment.

6. GRANTS FOR RESEARCH AND PROOF OF INNOVATIVE COMPOSTING TECHNIQUES

There are a number of grants available for innovative composting and food waste reduction techniques: the Agricultural and Food Research Initiative[462] (AFRI) broadly sustains research in all components of agriculture (past projects have included composting), and the SBIR Program[463] includes innovation towards sustainable materials management as a project type for small businesses. SBIR offers up to $100,000 for 'proof of concept' and up to $400,000 for commercialization of a technology. Although the SBIR opportunities are not applicable to most businesses within Kingston because of its focus on innovative and non-market ready technologies, these grants may be of interest to a small niche within the region.

7. GRANT FUNDING TABLE

Table 69. Funding for Composting provides a variety of funding opportunities to support various aspects of composting program implementation. Hyperlinks for each opportunity are incorporated as part of the grant name in the Grant Name column.

[461] "Urban Agriculture Grants and Engagement Opportunities", USDA, https://www.farmers.gov/your-business/urban/opportunities. Accessed November 8th, 2021.

[462] "Agriculture and Food Research Initiative", USDA, https://www.nifa.usda.gov/grants/programs/agriculture-food-research-initiative-afri. Accessed November 5th, 2021.

[463] "Small Business Innovation Research (SBIR) Program", ORD US EPA, May 1, 2015, https://www.epa.gov/sbir.

Table 69. Funding for Composting

Grant Name	Grantor	Description	Amount	Eligible Applicants
Climate Smart Communities Implementation Grants	NYS DEC	Provides 50/50 matching grants to cities, towns, villages and counties of New York State and boroughs of New York City for eligible climate adaption and mitigation projects. This is an annual grant program.	50/50 matching	Local governments.
Grants for Waste Reduction and Prevention	NYS DEC	Eligible projects include: educational efforts that prevent the generation of waste, materials reuse, promotion or use of refillable or reusable packaging, audits of procedures and practices, resulting in the elimination or reduction of materials disposed, increasing awareness of non-toxic household product substitutes, promotion of backyard or on-site composting, promotion of product stewardship initiatives.	50/50 matching	Local governments.
Grants for Recycling Capital Projects	NYS DEC	Eligible costs include: construction materials recycling facilities, construction of composting facilities, purchasing of recyclables processing equipment, purchasing of recycling containers, and purchasing of new recyclables collection vehicles.	50/50 matching	Local governments.
Solid Waste Management Grants	USDA	Evaluate current landfill conditions to determine threats to water resources; provide technical assistance and/or training to enhance operator skills in the operation and maintenance of active landfills; provide technical assistance and/or training to help communities reduce the solid waste stream.	50/50 matching	Rural communities.

Recycling Coordination and Education Projects[464]	NYS DEC	Eligible costs: Signs, advertising, planning, monitoring and modifying the local recycling program, developing public education and promotion tools, implementing recycling outreach strategies, establishing, monitoring and improving recyclables marketing, tracking and reporting, fostering inter-governmental recycling coordination, developing enforcement strategies, managing finances of the municipal recycling program.	50/50 matching	Local governments.
Supporting Anaerobic Digestion (AD) in Communities	US EPA	Eligible projects help reduce food loss and waste and divert food waste from landfills by expanding AD capacity in the United States.	Not currently available.	State, Local, Tribal, Interstate Governments and non-lobbying non-profits.
EPA Region 2 Sustainable Materials Management Grants	US EPA Region 2	Eligible projects improve sustainable materials management in Region 2 (includes NY); regional projects which address sustainable food management and/or sustainable packaging are also eligible.	Region estimates awarding a total of $150,000 for up to 3 grants and/or cooperative agreements.	States, local, Tribal, interstate, and intrastate government agencies and instrumentalities, and non-profit organizations.
Community Compost and Food Waste Reduction	USDA	Eligible projects develop and test strategies for planning and implementing municipal composting and food waste reduction plans.	Total of $2 million; up to 75% match of eligible costs.	City or township governments, state governments, county governments, special district governments.

[464] "Grants for Waste Reduction and Prevention Projects - NYS Dept. of Environmental Conservation", https://www.dec.ny.gov/chemical/105608.html. Accessed November 8, 2021.

Closed Loop Partners	Closed Loop Partners	Offer interest-free loans to enhance public sector recycling infrastructure; Invested to retain three composting sites in NYC during COVID budget cuts.	Typical loan size is $3-$5M over a 3-10 year term, with each loan secured by collateral.	Provide zero interest loans to municipalities and below market rate loans to private companies.
New York Green School Grant Program	NYSAR3	Eligible projects are provided seed, or start-up money for recycling/waste reduction programs in public and private schools.	Up to $1,000 per project.	K-12 Schools in NYS.
NYS Pollution Prevention Institute Community Grants Program	NYS P2I	Eligible projects seek to improve the health, environmental quality, and economic vitality of communities across New York State; designed to support initiatives that raise public awareness and understanding of environmental issues and that lead to adoption of sustainable practices.	$15,000-$50,000	Businesses, nonprofits, community groups, municipalities, and similar organizations that are registered with NYS.
Food Waste Reduction and Diversion Reimbursement Program	NYS P2I	Eligible New York State businesses or not-for-profits that generate, haul or recycle large amounts of food waste receive reimbursement for projects designed to offset the cost of select technologies and equipment that promise to reduce or divert that food waste from landfill or incineration.	Up to 44% of eligible project costs, in most cases not to exceed $100,000.	Businesses and nonprofits.
Agriculture and Food Research Initiative	USDA	Eligible projects include all components of agriculture, including farm efficiency and profitability, ranching, renewable energy, forestry (both urban and agroforestry), aquaculture, rural communities and entrepreneurship, human nutrition, food safety, biotechnology, and conventional breeding. Past projects have included composting.	Matching required if research is commodity specific; awards range from $1-$10 million.	Research organizations, including universities and extensions.

Small Business Innovation Research (SBIR) Program	US EPA	Eligible programs fit into the SBIR mission to protect human health and the environment; broad areas of focus typically stay the same and include clean and safe water, air quality, land revitalization, homeland security, sustainable materials management, and safer chemicals.	Up to $100,000 for 'proof of concept' and up to $400,000 for commercialization.	Small businesses with innovative ideas.
ReFED Nonprofit Food Recovery Accelerator	ReFED	The Accelerator immersed 10 nonprofit food recovery organizations in a combination of virtual curriculum and in-person ReFED Learning Labs. Its focus was on leveraging earned revenue models, technology solutions, and human-centered design to catalyze ideas around food waste reduction.	Curriculum and learning labs.	Food waste recovery nonprofits.

LISTING OF APPENDICES

Kingston Organics Diversion Study appendices are located in a separate document titled City of Kingston Organics Diversion Study – Appendices. Listed below are the appendices found in this document.

- Appendix A – Kingston Compost Survey
- Appendix B – Waste Estimates
- Appendix C – Food Waste Estimates
- Appendix D – Site Visits
- Appendix E – Demographics of Composting Locations
- Appendix F – Bins, Liners, and Totes
- Appendix G – Greenhouse Gas Emissions Analysis
- Appendix H – Case Studies