



CITY OF PHILADELPHIA MUNICIPAL WASTE MANAGEMENT PLAN 2018 - 2027



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Introduction and Purpose of Plan

2018-2027 Plan

The 2018-2027 Municipal Waste Management Plan for the City of Philadelphia (City) has been prepared in accordance with the Pennsylvania Municipal Waste Planning, Recycling, and Waste Reduction Act of 1988 (Act 101), the Pennsylvania Department of Environmental Protection (PADEP) January 2010 Guidance Document “*Guidelines for the Development and Implementation of County Municipal Waste Management Plan Revisions*” (Document Number 254-2212-504), and based on discussion with PADEP during Plan preparation. The City’s last plan revision was submitted to PADEP on June 21, 2005.

On July 3, 2013, in accordance with Section 271.252 of Title 25 of the Pennsylvania Code, the City provided written notification to the PADEP that a substantial plan revision would be prepared by the City’s Streets Department to its Municipal Solid Waste Plan. The notice provided that the plan revision would cover a ten year period, and would provide for updates to all components of the plan, specifically including incorporation of the Streets Department’s Request for Proposal (RFP) process for the selection of disposal contracts commencing on July 1, 2012.

On June 29, 2017, following consultation with PADEP, the City provided written notification to PADEP that it is withdrawing a draft plan revision that was submitted in March 2017 and will submit a non-substantial plan revision that will incorporate the City’s current disposal contracts (valid through June 30, 2019) and update its list of designated disposal facilities. PADEP and the City agreed that the non-substantial plan revision would be based on the draft plan revision previously submitted in March 2017, updated to include more recent data, programs, and policies supporting the City’s goal of Zero Waste by 2035. Following submittal of the non-substantial plan revision to PADEP, the City will initiate the process to submit a substantial plan revision. The substantial plan revision will coincide with issuance of a Request for Proposals in 2018 for disposal of City-collected waste (effective July 1, 2019) and an update of facilities designated for disposal of privately-collected waste.

Since created by Executive Order of Mayor James F. Kenney in December 2016, a primary focus of the Zero Waste and Litter Cabinet has been developing new metrics and collecting baseline data that will help move Philadelphia towards a Zero Waste and litter-free future. Details about these metrics are available in the Zero Waste and Litter Cabinet Action Plan (see Appendix I) and annual progress reports. While the substantial plan revision will incorporate these new data sources, this non-substantial plan revision was developed based on the City’s sustainability goals provided in Greenworks Philadelphia. Greenworks Philadelphia was launched in 2009 and served as the City’s first comprehensive sustainability plan. It represented the City’s vision and strategy to create a greener and more sustainable City. Greenworks Philadelphia had a six-year implementation timeline (through 2015) with goals that strive to provide benefits to the City and its citizens beyond 2015. In 2016, the Office of Sustainability released an updated plan titled Greenworks: A vision for a sustainable Philadelphia that continues to guide long-term sustainability work.

Greenworks Philadelphia built upon the work of the 2007 Local Action Plan for Climate Change that was produced by the City's Sustainability Working Group. Greenworks Philadelphia addresses sustainability through five goal areas:

- Energy – Reduce the City's vulnerability to rising energy prices.
- Environment – Reduce the City's environmental footprint.
- Equity – Deliver more equitable access to healthy neighborhoods.
- Economy – Create a competitive advantage from sustainability.
- Engagement – Unite to build a sustainable future.

While all of these overarching goals have been considered in the development of the 2018-2027 Municipal Waste Management Plan, several measurable targets and initiatives of Greenworks Philadelphia are of direct relevance to this Plan; specifically, targets and initiatives of the Energy and Environment goals:

- ***Purchase and generate 20% of the electricity used in Philadelphia from alternative energy sources (Target of the Energy Goal).*** While many of the initiatives of this target focus on solar energy, there are also waste-based initiatives. The Philadelphia Water Department (PWD) has entered into an agreement with Ameresco to design, build and maintain a biogas-to-energy facility at the Northeast Water Pollution Control Plant. The project uses biogas from wastewater digesters to generate thermal energy and 5.6 MW of electricity for on-site use. PWD is also exploring the feasibility of food waste digestion at the wastewater treatment plants.
- ***Divert 70% of solid waste from landfill disposal (Target of the Environment Goal).*** During the development and implementation of Greenworks Philadelphia, the City took numerous steps to expand residential recycling services and to expand recycling to outdoor spaces and for special events. Other key initiatives include:
 - Transition to single-stream recycling with the addition of #1 and #2 plastics and cardboard to curbside recycling completed in July 2008.
 - Weekly curbside collection of recyclable materials completed in January 2009.
 - Implementation of the City's Recycling Rewards Program completed in July 2009.
 - Addition of #3 - #7 plastics to curbside collection completed in August 2010.
 - Addition of cartons and aseptic packaging to curbside collection in December 2011.

- Recycling program rebranding, as needed, to promote smarter and more successful recycling efforts City-wide.
- Implementation of a comprehensive anti-littering campaign beginning during the fall of 2010 with rebranding, as needed, to maintain effectiveness.
- Expansion of leaf collection practices, including increasing the number of seasonal collection sites to 23 and re-establishing mechanical leaf collection in certain parts of the City in the fall of 2015.
- Continued development of the Philly Spring Cleanup which involves over 500 community organizations.
- Deployment of a network of nearly a thousand BigBelly solar compactor units throughout the City, first implemented in Center City in 2009.
- The City has entered into new solid waste contracts that will allow the City to minimize the amount of municipal solid waste collected by the City that will be landfilled. The contracts began in 2012 with a 4 year base term and three one year renewal terms. These contracts utilize waste to energy facilities and innovative waste processing technologies.
- The City has initiated a feasibility study to explore the potential for implementing an organics management program to further divert waste from landfill disposal.

Various sources of data and information have been used to update the City's Plan, including a waste composition study conducted in 2009 and 2010 and funded with an Act 101 Section 901 Grant. The composition data was updated in 2014 (for materials disposed of in the BigBelly compactors) and 2015 (for single-stream materials collected curbside).

Additionally, an updated survey of disposal facilities was conducted as a part of the planning process for the 2018-2027 Plan. PADEP Disposal Facilities reports and Solid Waste and Recycling Hauler Reports submitted to the Streets Department's Recycling Office along with other data sources have also been used to form the basis for describing how municipal waste is managed in the City of Philadelphia.

Benefits of Plan

The City's initial Municipal Waste Management Plan and the subsequent adopted Plan Revisions, inclusive of this 2018-2027 Plan Revision, provide an organized framework for the City to plan for and implement a sustainable solid waste management system that is consistent with applicable policies, regulations, and industry practices. Some of the key benefits of the Plan to the City and its citizens and businesses are summarized below.

- The Plan provides for documentation regarding waste generation and management practices, including recycling programs, providing a framework for the City to make ongoing planning decisions and to effectively implement appropriate practices.

- The Plan incorporates long-term, cost-effective waste management and recycling strategies that provide for handling, transportation and disposal at permitted facilities with adequate capacity to meet the needs of the City.
- The Plan incorporates programs, initiatives and strategies aimed at continuously maintaining or improving waste and recycling management practices, such as the City's in-depth anti-litter campaign and public space/public event recycling programs, providing City-wide benefits to public health and safety.
- The Plan provides for increased public awareness and participation, providing citizens and businesses opportunities to build upon the sustainability goals of Greenworks Philadelphia and continue to serve as good environmental stewards of the City.

History of the Philadelphia Municipal Waste Management Plan

The initial 1990 – 2000 Plan was adopted by the City in March 1991. As the Streets Department implemented components of the 1990 – 2000 Plan, it was subsequently revised with the adoption of Plan Revisions in May 1994 and June 1998. In August 2001, a more comprehensive (but non-substantial) Plan Revision was completed covering the period of 2000 - 2010, with the most recent update being the 2005 Plan Revision. The development, adoption, and approval of the original Plan and subsequent Plan Revisions are summarized in Appendix A.

Solid Waste and Recycling Advisory Committee

In December of 1988 the City established a solid waste advisory committee, consisting of members representing a diverse cross section of constituent interests in the City. The charge to the committee was to provide meaningful input in the development of the City's 1990 – 2000 Municipal Waste Management Plan (i.e., the initial Act 101 Plan for the City). Over time, a number of new members were appointed to the committee to participate in the development of Plan Revisions. The City also established a recycling advisory committee. In December 2008 the Mayor issued Executive Order 15-08 which consolidated the then-existing recycling advisory committee and solid waste advisory committee into one committee (Solid Waste and Recycling Advisory Committee or SWRAC). A new SWRAC was appointed in 2013 for the purpose of preparing the 2018-2027 Plan. Chapter 13 of this Plan identifies SWRAC members and includes information on SWRAC's involvement in development of this Plan.

Major Components of the 2018-2027 Plan

Management of City Collected Waste

The Streets Department's Sanitation Division provides residential trash collection for about 540,000 households in Philadelphia. The Streets Department has adopted regulations governing the set out of trash and recycling for residents and small businesses that qualify for City trash and recycling collection services. These regulations were last revised during the fall 2013.

The Streets Department has established a procurement process for selecting Contractors to process and dispose of City-collected municipal waste. The framework for these Contracts beginning in 1994 has been a base contract term of 4 years with three one year renewal terms in accordance with the City Charter. In October 2011, the City issued a Request for Proposals (RFP) to select Contractors for a new term beginning on July 1, 2012 (Fiscal Year 2013 – 2019). Through the RFP process, the City selected Covanta to manage 550 tons per day of City-collected waste and Waste Management to manage 1,750 tons per day of City-collected waste. In accordance with the City's Greenworks goals and goals of the RFP the quantity of waste landfilled has been minimized and up to 1,000 tons per day may be processed using Waste Management's SpecFUEL™ technology. The disposal RFP process will continue to be used as a framework for evaluating a range of alternative technologies. A number of these alternative approaches are described in this Plan.

Management of Privately Collected Waste

As was the case with the City's 2000 – 2010 Plan and subsequent revisions, the City has adopted a menu plan approach for the disposal of privately collected municipal waste. As a part of the planning process disposal facilities were surveyed. This plan identifies facilities and projected capacity available for privately collected waste for the 10 year term of the Plan. A supporting infrastructure of transfer facilities is described in the Plan.

Recycling Goals

In December 2008 the Mayor issued Executive Order 15-08, which established an overall recycling goal of 50%. The City surpassed this goal in 2010, and since then, has achieved an annual recycling rate ranging from 46% to 50%. The City will continue to build on past achievements in an ongoing effort to meet and exceed the 50% goal. This will be accomplished through continued development of the City's curbside collection program and enforcement of its Commercial Recycling Regulations. Updates to these regulations will be made, as necessary, as part of this planning process.

Recycling Programs for City-Collected Recyclables

The City implemented single-stream recycling during 2007 and 2008 with weekly collection beginning in January 2009 for approximately 540,000 households with City trash and recycling collection services. During this implementation process, the City also added the curbside collection of #1 - #7 plastic containers, cardboard, cartons, and aseptic packaging. In July 2010, the City fully phased-in its Citywide Recycling Rewards program to provide incentives for increased recycling.

This collection and processing approach will continue to be used through the term of the Plan. The Plan allows for ongoing assessment of the recycling program; if viable markets are identified and curbside collections are feasible additional materials will be added to the curbside collection program. The City will also continue to build on its successful media plan and outreach programs using its Streets, Walkways, Education and Enforcement Program (SWEEP) and Philadelphia More Beautiful Committee (PMBC) program network of over 6,000 Block Captains to sustain the City's recycling efforts.

Recycling Programs for Privately-Collected Recyclables

The City adopted Commercial Recycling Regulations in July 1994. Additionally, the City has adopted new Dumpster Regulations. During development of this Plan, City Council passed a new recycling ordinance that allows for the Department to issue updated rules and regulations and to increase fines for non-compliance (with a particular emphasis on commercial recycling). The Streets Department will continue to require that all regulated premises provide recycling services and file a Recycling Plan with the Streets Department's Recycling Office and use trash and recycling haulers registered with the department. These requirements are enforced through the Department's SWEEP Unit.

Recycling Programs for Municipal Buildings

The Streets Department's Sanitation Division collects the same recyclable materials collected as part of the residential curbside collection program from City buildings. Large City buildings are collected as part of a separate route and most smaller buildings are collected along with residential collections. The Sanitation Division also provides weekly collection for participating School District Buildings. In 2014 the Recycling Office began a comprehensive outreach program to reinforce municipal building recycling efforts. These programs will remain in place through the term of the Plan.

Litter Management Programs

The Streets Department's Sanitation Division Citywide Cleaning Unit manages collections for a network of litter baskets and solar powered BigBelly compactor units. Citywide Cleaning also provide mechanical streets cleaning services along a number of business corridors as well as cleanups of illegal dumping. This infrastructure also supports block cleanups managed by PMBC and its network of Block Captains as well as cleanup programs organized by community organizations. This effort is launched each year in April with the Philly Spring Cleanup started in 2007. This effort has grown to include over 560 community organizations. The Sanitation Division's anti-litter campaign is designed to build and support these ongoing efforts with the establishment of Litter Free Blocks, Zones, and Business Ambassadors using the Philly Spring Cleanup network of community groups and PMBC Block Captains to create a sustained year long cleanup effort.

Household Hazardous Waste and Electronics

The City has established a network of one-day household hazardous waste drop off programs which includes participation in the Southeastern Pennsylvania Regional Household Hazardous Waste Program with the Counties of Bucks, Chester, Delaware, and Montgomery. The Streets Department's Sanitation Division also provides for the acceptance of TVs, computers and other electronics at all of the City's Sanitation Convenience Centers.

Biosolids Management (Water Department)

Biosolids generated in the City are processed at the Biosolids Recycling Center (BRC), which has been in operation since 1990. Beginning in 2012, the biosolids have been dewatered, dried and pelletized, resulting in Granulite that is produced and marketed by

Philadelphia Renewable Bio-Fuel (PRBF). The dried sludge pellets are used as a fuel source for Lehigh Cement and as fertilizer for agricultural use. During normal operations, there is no longer any landfilling of sludge cake or dried sludge pellets.

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Chapter 1 – Description of Waste

1.0 Introduction

Municipal waste is generated within the City of Philadelphia across the entire geographical community, including residences, retail and commercial establishments, municipal and institutional establishments, and from community events. Other types of waste that require special handling are also generated within the City, including infectious and chemotherapeutic waste, construction and demolition waste, household hazardous waste, tires and biosolids. This Chapter describes the origin and content of waste based on the most current data available.

1.1 General Characteristics of the City

1.1.1 Overview

The City of Philadelphia, which comprises in its entirety the County of Philadelphia, is located in southeastern Pennsylvania. It is bordered to the northeast by Bucks County, to the northwest by Montgomery County, and to the southwest by Delaware County. The Delaware River runs along the eastern and southern boundary separating the City from the State of New Jersey (see Figure 1-1).

The City of Philadelphia consists of numerous neighborhoods and other political, planning and service districts that encompass those neighborhoods. For purposes of waste collection and management, the City is divided into six Service Areas that are further subdivided into thirteen Sanitation Collection Districts.



**Figure 1-1. City of Philadelphia
Geographical Boundaries**

From the time of its founding in the late 17th century, Philadelphia has been shaped by thoughtful planning to make the most of its location, urban form, and access to resources. As the heart of a new nation, Philadelphia's port on the Delaware River was a center of commerce. In the early 19th century, the port was augmented by railroads that fed Philadelphia with raw materials for manufacture and distribution making it, for a time, the "Workshop of the World." In the mid-20th century the construction of interstate highways and a new airport increased the flow of goods and access to and from the City. By this time a rich transit network, including high-speed subways and elevated trains, commuter rail, buses, and trolleys was in place.

Based on 2010 census data, Philadelphia is the largest city in Pennsylvania and is the fifth most populous city in the United States, with a population of more than 1.5 million people. It has a land area of approximately 134 square miles, and a population density of approximately 11,380 persons per square mile. Philadelphia's

population peaked in the early 1950's. As in many cities of the Northeast, a decades-long period of de-industrialization resulted in closed factories, population loss, vacant land, and urban decay. Yet by 2010, reinvestment and economic diversification stabilized and reversed the decline of population. For the first time in 50 years the City experienced a population gain, albeit modest (0.6 percent), according to the U.S. Census Bureau. New developments reshaped the skyline and vitality returned to many neighborhoods.

Today the city is the sum of its many assets – a strong metropolitan center, the engine of business/institutional/cultural output and employment; a fabric of diverse and authentic neighborhoods; and industrial-legacy areas ripe for a mix of new uses, all of which are supported by a dynamic foundation of transportation resources: highways, freight and passenger rail, public transit, seaports, and airports.

1.1.2 Regional Context

The City of Philadelphia has a central location within densely populated and growing markets. Philadelphia is the urban center of a four-state “Greater Philadelphia” region comprised of the 12 counties within the Metropolitan Statistical Areas (MSA) of Philadelphia-Camden-Wilmington, PA-NJ-DE-MD, and Trenton-Ewing, NJ, as defined by the U.S. Census Bureau. This Greater Philadelphia region is projected to grow from 6.3 million to about 7.0 million people between 2010 and 2035.

Philadelphia is also the geographic hub of an “extended region” that includes Greater Philadelphia and 11 counties closely related by proximity, trade, and culture. Trends indicate that the population of this extended region will increase from approximately 9.4 million to nearly 10.7 million residents over the next 25 years. At a larger scale, Philadelphia is centrally situated along the Northeast Megaregion, the 54-million-person corridor from Southern Maine to Northern Virginia that is likely to grow to 60 million people by 2035.

1.1.3 Environment

Philadelphia's location and development history strongly influence the City's environment. Direct access to both the Delaware and Schuylkill Rivers provides Philadelphia with a generally reliable quantity of water, yet extensive investment in treatment and watershed management is required to protect the quality of the City's drinking water from point and non-point pollution throughout the expansive drainage areas. Greater Philadelphia has a balanced, four-season climate. However, the quality of the region's air is harmed by contaminants transported into the area by prevailing winds and by the region's excessive consumption of fossil fuels during hot and cold weather. One of the City's major environmental legacies is a large amount of vacant land resulting from previous deindustrialization and population loss. The highest and best reuse of this vacant land is often complicated by soil instability due to previous fill of stream beds or waterfronts, or by soil contamination linked to previous industrial uses or construction practices. Figure 1-2 shows land use in the City as recorded in 2010.

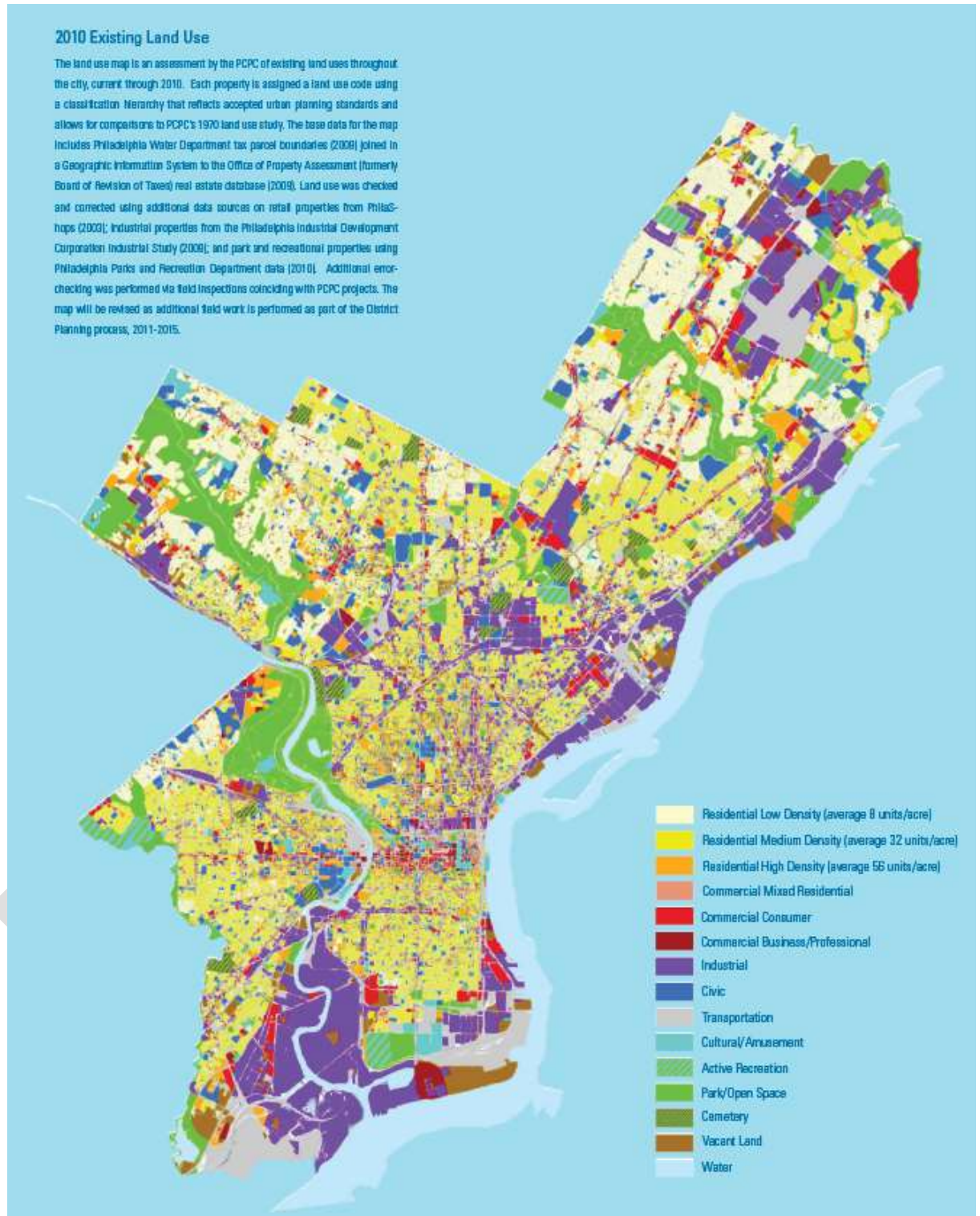


Figure 1-2. City of Philadelphia Land Use Map (2010)

Philadelphia and its public and private partners continue to make progress toward compliance with increasingly stringent standards for environmental performance and mitigation of natural hazards. Since the 1970's, the quality of the City's air and water show marked improvement due to decades of conscientious environmental stewardship, investment, and significant reductions in heavy industrial activity. For example, public and nonprofit partners, such as the Philadelphia Air Management Services and the Delaware Valley Regional Planning Commission (DVRPC), are working towards U.S. Environmental Protection Agency (USEPA) air-quality standards for ground-level ozone and fine particulate matter, and the City is pioneering an integrated "green infrastructure" approach to help reach compliance with USEPA regulations for combined-sewer overflows. In conjunction with these and other efforts, Philadelphia and its partners are implementing strategies to aggressively reduce total and per-capita greenhouse gas (GHG) emissions attributable to the City and region. Additionally, the City is updating assessments of risks from flooding, extreme temperatures, high winds, and soil instability.

The City's people, buildings, infrastructure, and natural areas are vulnerable to environmental changes associated with long-term climate change. An estimated rise in sea level of one meter by the year 2100 places homes, businesses, and facilities in Philadelphia tidal areas at greater risk for regular tidal inundation and periodic flooding. Sea-level rise also poses challenges to the ecologies of tidal wetlands and the salt line on the Delaware River. Forecasts based on low and high GHG emission scenarios estimate increases of between 3°F and 14°F in average Pennsylvania temperatures toward the end of this century. In Philadelphia, prolonged excessive heat poses particular risks for vulnerable populations, transportation and utility systems, energy budgets, and activities that traditionally take place outdoors in warm weather months.

Citywide, GHG emissions decreased by 9% between 2006 and 2012. Reducing energy consumption in buildings was the leading contributor to this decrease. As shown in Figure 1-3, the building stock accounted for over half of all GHG emissions in Philadelphia in 2012. Between 2006 and 2013, GHG emissions from City government sources have declined nearly ten percent to approximately 500,000 metric tons of CO₂-equivalent (MtCO₂e). The largest sector for carbon emissions in the municipal inventory are buildings owned and operated by the City of Philadelphia.

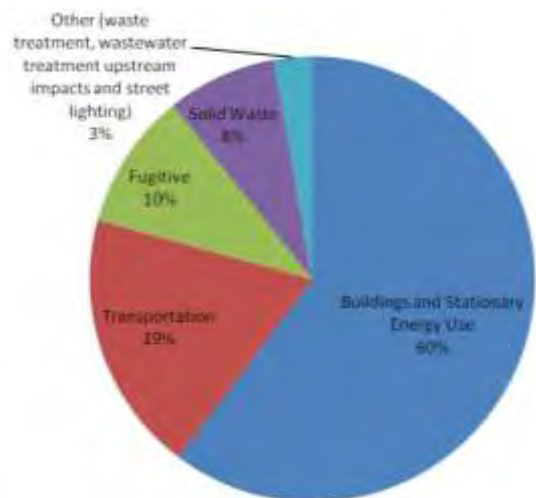
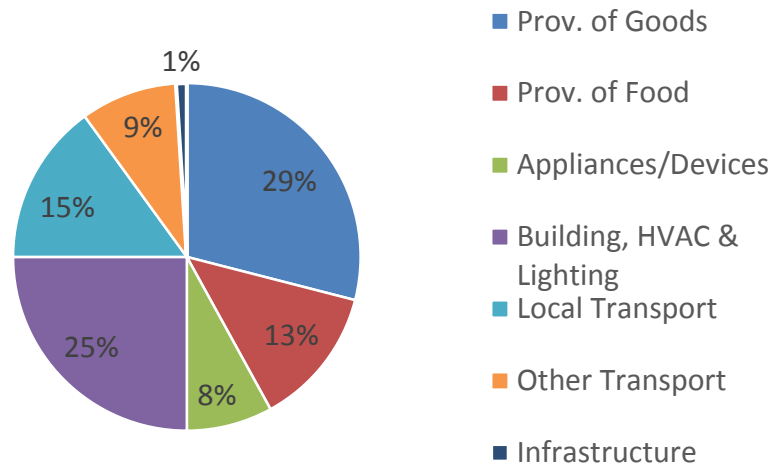


Figure 1-3. 2012 GHG Emissions by Sector (Philadelphia, City-Wide)

While quantifying GHG emissions by sector as detailed in Figure 1-3 is the standard method, the U.S. EPA has developed an alternative model that examines the full lifecycle emissions associated with waste, materials and products. By this lifecycle or “systems based” measure, some 42 percent of U.S. GHG emissions are associated with activities related to the provision of products, goods and food, which are all materials that require utilization of resources and end of life management.

Consequently, from a lifecycle perspective of materials and waste, upstream activities, such as extraction and production, present the largest opportunities to mitigate GHG emissions and environmental impacts. Figure 1-4 shows estimated U.S. GHG emissions using the systems-based approach (Source: U.S. EPA).

Figure 1-4. U.S. Systems-Based GHG Emissions (Source: U.S. EPA)



1.2 Origin of Municipal Waste

Residential waste managed by the City’s Department of Streets includes single-family dwellings and multi-family dwellings of six units or less. Approximately 540,000 residential units are currently served by the City. Under certain conditions, including upon application and subject to recycling requirements, residential condominiums and cooperatives larger than six units may be eligible for City collection.

Certain small businesses are eligible for City collection based on quantity, frequency and type of waste. To be eligible, businesses must not set out more than 6 containers or 12 bags of trash per collection; the establishment must not require collection frequency more than once a week; and the location must not receive private hauler service in any form. Small commercial establishments that qualify for City collection are assessed an annual fee for trash and recycling collections. Additionally, the Streets Department provides collections for City buildings located along residential collection routes such as Recreation, Police and Fire Department facilities, and for about 35 larger City administrative buildings. The

Department also provides recycling collections for City School District Buildings. All collection services provided by the City are provided on a weekly basis.

In 2015, waste collected by the City accounted for approximately 26% of the total municipal waste generated in Philadelphia.

Municipal waste is also generated by commercial and institutional sources, which accounts for approximately 74% of the total municipal waste generated in Philadelphia. Commercial establishments not meeting the requirements for City collection, including certain types of businesses that are specifically not eligible for City collection (e.g., manufacturers, wholesalers, gas stations, and automotive repair shops) are served by private haulers. Private haulers also collect waste from about 123,000 condominium units that do not qualify for City collection.

The City has enacted regulations governing municipal and private collection of refuse. Chapter 9 of this Plan addresses the codes, ordinances, resolutions, regulations, agreements and other documents that give the City the authority and the means to carry out and enforce the elements of this Plan.

1.3 Content of Municipal Waste

Municipal waste generated by residential, commercial and institutional sources is a heterogeneous mixture of discarded items such as packaging and containers, food waste, yard trimmings, durable goods (such as furniture), nondurable goods (such as paper and clothing), and other items. The composition of a specific waste stream from a defined area (i.e., local, regional or state-wide) can be estimated by performing a waste characterization analysis, which in turn can facilitate effective waste management planning and program implementation. In 2001, PADEP performed a statewide study. Due to the date of that study and the availability of more recent, local data, the PADEP study has not been included in this Plan. The City of Philadelphia performed a local study in 2009-2010, which is incorporated herein. The composition of municipal waste can also be estimated by broader studies, such as data collected and reported by the United States Environmental Protection Agency (USEPA) on the characteristics of the municipal solid waste stream of the nation as a whole. Summary data from the USEPA for 2014, which is the most recent USEPA data available, is included herein.

In 2009 and 2010, the City of Philadelphia performed a Residential Waste and Recyclables Characterization Study. A copy of the Study is provided in Appendix C. The Study included collection of waste samples at a transfer station receiving City-collected municipal waste, and the collection of recyclables samples at a Material Recovery Facility (MRF) receiving City-collected single stream recyclables. Samples were collected in the fall of 2009 and the spring of 2010 to incorporate potential seasonality differences, and were collected from across all Sanitation Collection Districts. The results were tabulated to depict the estimated composition of waste as generated in the City (before recycling), the composition of waste after recycling, and the composition of recyclables. Table 1-1 shows the composition of municipal waste after recycling based on the City's 2009-2010 characterization study. Data on the composition of recyclables is presented in other Chapters of this Plan.

Table 1-1. Waste Characterization Data ⁽¹⁾

Material	City of Philadelphia Residential Waste and Recyclables Characterization Study (2009-2010)	USEPA MSW Characterization Report (2014)
Paper	14.7%	14.3%
Plastic	10.1%	17.8%
Glass	2.0%	5.0%
Metal	3.0%	9.1%
Food Waste	10.8%	21.6%
Yard Trimmings	11.4%	7.9%
Rubber/Leather	1.3%	4.0%
Textiles	6.2%	8.0%
Wood ⁽²⁾	7.4%	8.0%
Misc. Inorganics ⁽³⁾	5.9%	2.4%
Other Wastes ⁽⁴⁾	26.8%	1.9%

1. Percent by weight of materials discarded (after recycling). Totals may not add to 100% due to rounding.
2. Includes clean wood and painted/stained/treated wood for City data, and non-C&D wood such as pallets and other wood packaging for USEPA data.
3. Includes dirt/fines for both data sets, as well as block/brick/stone for the City data set (USEPA data excludes C&D waste).
4. The composition of "Other Wastes" varies for the two data sets, but generally includes materials such as carpet/padding, diapers/sanitary products, bulky items, electronics, tires, and other materials.

For planning purposes, the City's data is a reasonable representation of the composition of residential waste, which comprises approximately 26% of the total municipal waste generated in the City. However, it is possible that the balance of waste, which consists primarily of commercial and institutional waste collected by private haulers, has a somewhat different composition than the residential waste stream. To consider a possible range of composition that would also be inclusive of the commercial and institutional waste generators, it is beneficial to consider data published by the USEPA.

The USEPA has compiled an historical database on the characterization of materials and products in municipal solid waste. A full report is released every two years, providing information on municipal solid waste generation, recovery, and disposal dating back to 1960. The most recent data was issued in December 2016, and is titled "*Advancing Sustainable Materials Management: 2014 Tables and Figures*". Sources of municipal waste, as characterized in USEPA's report, includes residential waste (including waste from apartment houses) and waste from commercial and institutional locations, such as businesses, schools, and hospitals. In addition to including commercial and institutional waste generators, USEPA's database also has certain other inherent differences when compared to the City's data. For example, the USEPA methodology and resulting data

excludes construction and demolition waste, although it does include certain products and materials that the City characterized as C&D waste in its study (e.g., clean wood, which could be in the form of packaging such as pallets, and certain inorganic materials such as dirt, fines and stones that may be found in municipal solid waste.) The EPA methodology is based on a materials flow model and economic data and provides national generation, tonnage, and percentage data by material and product categories.

USEPA's most recent waste characterization data is shown in Table 1-1 alongside the City of Philadelphia's data. For planning purposes, the City's data is considered to be more representative of local conditions for residential waste. The USEPA data provides insight as to the possible composition of waste from the commercial and institutional sectors. Together, these data sets are indicative of the content of municipal waste addressed under this Plan.

1.4 The Impact of Recycling on Residential Waste Generation and Disposal

Recycling has a positive impact on waste disposal, by removing materials from the waste stream and utilizing those materials as feedstock for new materials or products. In 2000, the City of Philadelphia conducted a waste characterization study. Following that study, numerous recycling program improvements were implemented, including:

- July 2006 – added collection of #1 and #2 plastics and cardboard to curbside recycling, and began single stream recycling in Service Area 6.
- July 2008 – completed the citywide expansion of single stream recycling.
- January 2009 – implemented weekly recycling collection on a citywide basis.

The impacts of these recycling program improvements on waste disposal were evident following the City's 2009-2010 Waste Characterization Study, which documented significant improvements to the capture rates for all material categories. Since that time, the City has implemented additional recycling program improvements, including:

- February to July 2010 – implemented the Recycling Rewards Program Citywide.
- August 2010 – added collection of #3 through #7 plastics to curbside recycling.
- December 2011 – added cartons (aseptic/polycoated containers) to curbside recycling.

Table 1-2 summarizes the estimated capture rates of recyclables as reported in 2000, and subsequently following characterization studies conducted in 2009/2010 and in 2015. Additional information on the City's extensive recycling program is provided in Chapter 4 of this Plan.

Table 1-2. Estimated Capture Rates of Curbside Recyclable Materials ⁽¹⁾

Material	2000	2009-2010	2015
OCC/Kraft	0.1%	63.5%	56.1%
Newspaper	33.9%	69.9%	63.8%
High Grade Paper	11.1%	44.3%	24.1%
Magazine/Glossy	12.2%	47.6%	49.6%
Mixed Paper	1.8% combined	27.3%	45.5%
Aseptic/Polycoated Containers		22.8%	29.7%
#1 PET Containers	0.0%	38.4%	57.7%
#2 HDPE Containers	0.0%	34.5%	50.4%
#3-7 Containers	--	--	69.5%
Plastic Tubs/Cups	--	--	59.0%
Glass Food & Beverage Containers	36.5%	74.9%	88.9%
Ferrous Cans	23.8%	43.1%	58.7%
Aluminum Cans	25.4%	41.0%	52.4%

1. Based on the City's waste characterization studies conducted in 2000 and 2009/2010 and the City's MRF characterization study conducted in 2015 (and applied to 2015 data).

1.5 Quantity of Municipal Waste

In 2015, approximately 2.2 million tons of municipal waste was generated in the City, including residential and commercial/institutional waste, along with approximately 0.4 million tons of construction and demolition waste. It is estimated that 49% of this waste was recycled, and the remainder was disposed at a combination of landfill and waste to energy facilities (see Chapter 2 of this Plan). Table 1-3 summarizes the quantity of waste generated, recycled and disposed in 2015. Additional information on construction and demolition waste is provided in Section 1.6, along with information on other types and quantities of waste.

The column labeled "Subtotal" in Table 1-3 is the total quantity of municipal waste generated, recycled and disposed in the City from residential and commercial sources in 2015. This data can be compared to the most recent data collected by USEPA, as reported in Advancing Sustainable Materials Management: 2014 Fact Sheet. USEPA reports that on average, the recycling rate in the United States for 2014 (the latest year data is published) was approximately 34.6% of the total waste generated. The City's most recently-reported recycling rate for residential and commercial waste is estimated to be approximately 41% (2015 data), which is higher than the national average. Including recycling of C&D waste, the City's total recycling rate in 2015 was estimated to be approximately 49%.

Table 1-3. Quantities of Waste Generated, Recycled and Disposed (2015)

Parameter	Residential	Commercial	Subtotal ⁽¹⁾	C&D ⁽³⁾	Total ⁽²⁾
Recycled (tons)	116,553	801,795	918,348	393,424	1,311,772
Disposed (tons)	459,330	868,974	1,328,304	45,699	1,374,003
Generated (tons)	575,883	1,670,769	2,246,652	439,124	2,685,775
Recycling Rate % of Generation	20.2%	48.0%	40.9%	89.6%	48.8%

1. Subtotal column includes only residential and commercial quantities.
2. Total column includes residential, commercial and C&D quantities.
3. C&D is construction and demolition waste collected by commercial haulers.

1.6 Description of Other Types and Quantities of Waste

Article VIII of Title 25 (Environmental Protection) of the PA Code specifies requirements for municipal waste processing, disposal, transportation, collection and storage, and includes certain residual and special handling waste. The following types of waste are addressed in this Chapter: infectious and chemotherapeutic waste, construction and demolition waste, household hazardous waste, tires, ash from resource recovery facilities, and biosolids.

1.6.1 Infectious and Chemotherapeutic Waste

Infectious and Chemotherapeutic Waste (ICW) is generally considered a type of residual waste that is regulated in Pennsylvania as a municipal waste. These terms are specifically defined in Title 25, Chapter 271.1 of the PA Code. These regulations were updated in 2014, including adoption of the term Regulated Medical Waste (RMW) for consistency with federal regulations. In summary, infectious and chemotherapeutic waste are described as follows:

- **Infectious Waste or Regulated Medical Waste** generally means municipal and residual waste which is generated in the diagnosis, treatment, immunization or autopsy of human beings or animals, in research pertaining thereto, in the preparation of human or animal remains for internment or cremation, or in the production or testing of biologicals, and which falls under one or more of the following categories: cultures and stocks, pathological waste, human blood and body fluid, animal waste, isolation waste, used sharps.
- **Chemotherapeutic Waste** generally means waste resulting from the production or use of antineoplastic agents used for the purpose of inhibiting or stopping the growth of malignant cells or killing malignant cells, and that is not otherwise defined as hazardous waste.

The City of Philadelphia Department of Public Health operates eight City health centers located in neighborhoods across the City, staffed by doctors, nurses, dentists and other health care providers. The City also has a state-of-the-art health laboratory that performs a wide range of testing services of the Department of Public Health as well as for selected outside agencies. In addition, there are many other community health facilities throughout the City, including doctors, dentists, nursing/residential care facilities, veterinarians, funeral homes and medical labs.

ICW generated by medical facilities within the City may be disposed of through a variety of methods, which include on-site treatment and/or hauling by private contractors to regional, off-site processing and disposal facilities. ICW can only be picked up or delivered commercially in Pennsylvania by an ICW transporter licensed by PADEP. PADEP maintains a list of licensed ICW transporters, which is updated monthly. As of September 2017, there were approximately 51 active ICW transporters licensed by PADEP. PADEP also permits ICW processing facilities. PADEP currently shows that there are five permitted processing facilities, none of which are located in the City of Philadelphia.

PADEP requires ICW transporters to complete annual reports documenting the quantity, type (infectious, processed infectious-recognizable, chemotherapeutic), source (by County), and destination of ICW waste. According to data published by the PADEP Division of Reporting and Fee Collection, approximately 6,876 tons of ICW was generated within the City of Philadelphia and ultimately disposed of at four locations in 2015. This data is summarized in Table 1-4.

Table 1-4. Generation and Disposal of ICW (2015) ⁽¹⁾

Disposal Facility	Quantity of ICW (tons)
Pioneer Crossing Landfill	2,082
Tullytown Resource Recovery Facility Landfill	4,328
Conestoga Landfill	219
G.R.O.W.S. North Landfill	247
Total ICW (2015)	6,876

1. Source: PADEP Bureau of Waste Management, Division of Reporting and Fee Collection.

1.6.2 Construction and Demolition Waste

Construction and demolition (C&D) waste is solid waste resulting from the construction, reconstruction, renovation, and demolition of buildings and other structures, including, but not limited to, wood, plaster, metals, asphaltic substances, bricks, block and unsegregated concrete. According to data published by the PADEP Division of Reporting and Fee Collection, approximately 45,699 tons of C&D

waste from Philadelphia was disposed of at ten locations in 2015. In addition, commercial haulers and processors serving Philadelphia businesses report that an additional 393,424 tons of C&D waste was recycled in 2015. This represents a total generation of 439,124 tons of C&D waste in 2015 with a recycling rate of almost 90%. The recycling rate may be even higher, due to the difficulty in obtaining recycling data from private haulers. Reported data is summarized in Table 1-5.

Table 1-5. Generation, Recycling and Disposal of C&D Waste (2015) ⁽¹⁾⁽²⁾

C&D Disposal Facility	Quantity of C&D Waste (tons)
IESI PA Bethlehem Landfill	93
Modern Landfill	94
Rolling Hills Landfill	21,138
Western Berks Community Landfill	22
Chester County SWA Lanchester Landfill	124
Cumberland County Landfill	1
Tullytown Resource Recovery Facility Landfill	2,910
Conestoga Landfill	17,655
G.R.O.W.S. North Landfill	3,572
Wheelabrator Falls Resource Recovery Facility	90
Total C&D Waste Disposed (2015) ⁽¹⁾	45,699
Reported C&D Waste Recycled (2015) ⁽³⁾	393,424
Total C&D Waste Generated (2015)	439,124
C&D Waste Recycling Rate (2015)	89.6%

1. Source: PADEP Bureau of Waste Management, Division of Reporting and Fee Collection (disposal data), and City of Philadelphia recycling data.
2. Excludes municipal waste generated by homeowners that is characterized as C&D waste, and that is collected by the City as part of residential municipal waste (e.g., clean wood, painted/stained/treated wood, dirt and fines, block/brick/stone, carpet/padding, and other materials typical of home construction activities).
3. Recycling data is difficult to consistently obtain from private haulers, and may be higher than is reported herein.

1.6.3 Household Hazardous Waste

The Streets Department held its first Household Hazardous Waste (HHW) event in April 1994. This program was expanded to 4 events in 1998 and to 7 events in 2003. The City currently hosts approximately seven HHW events annually.

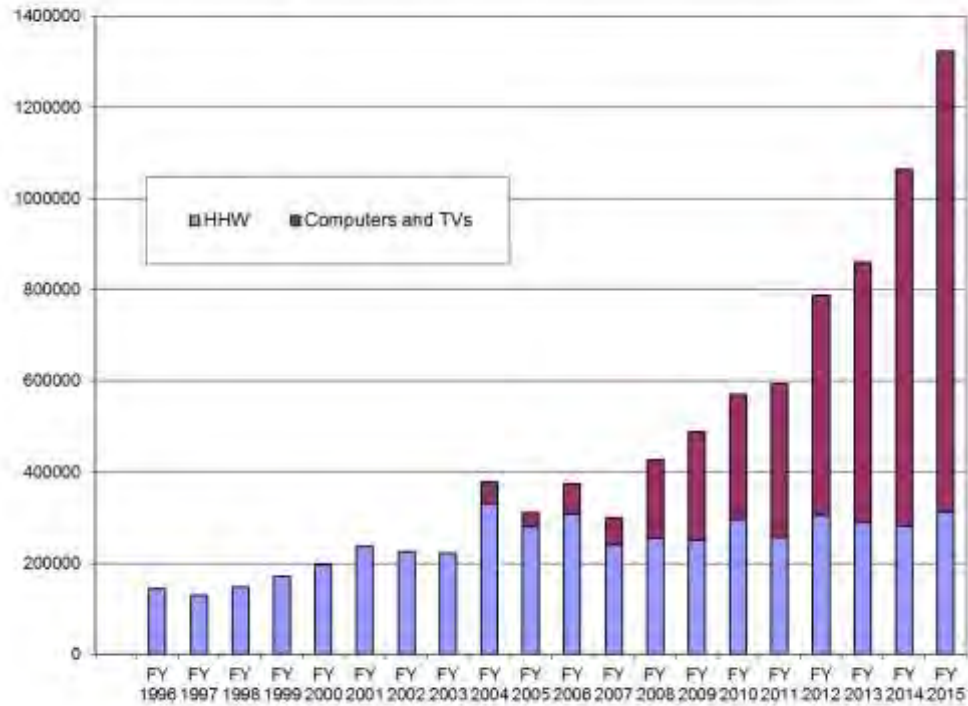
The Southeastern Pennsylvania Counties of Bucks, Chester, Delaware, Montgomery, and City of Philadelphia have worked together to implement a regional household hazardous waste collection program based, in part, upon recommendations made in the report titled, *A Feasibility Analysis of a Household Hazardous Waste System in Southeastern Pennsylvania* prepared by the Waste Watch Center and the Pennsylvania Resources Council in June 1996. The report can be obtained from the Delaware Valley Regional Planning Commission. This program was implemented in 1998 and the Counties have jointly signed an inter-governmental agreement.

The goals of the City and regional program are to: 1) provide a safe and moderately convenient disposal service to area residents; 2) increase participation in HHW collections; 3) provide more focused and targeted long term publicity about the safe use and handling of hazardous household products and their associated wastes; 4) provide cost-effective reuse and recycling of HHW; 5) promote source reduction of HHW; and 6) add services for businesses where possible at a later date. Overall, the yearly participation goal is to serve 20,000 to 25,000 households throughout the region.

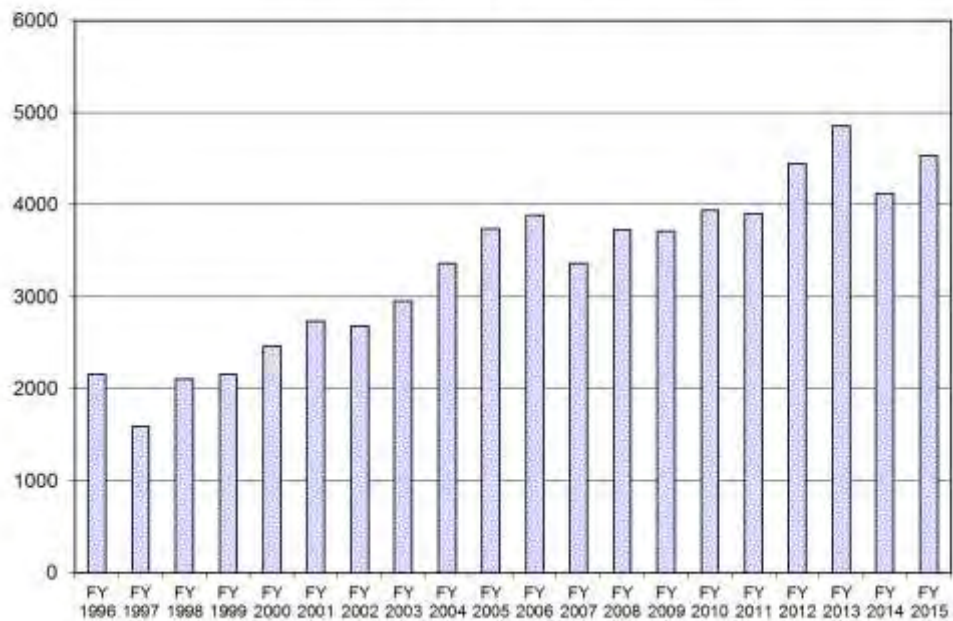
The City began accepting e-waste (including computers and TVs) at HHW events in 2004 and at three Sanitation Convenience Centers in 2008. Since 2011, the quantity of computers and TVs collected has more than doubled, with over 95% of this e-waste collected at the Sanitation Convenience Centers. Currently, the City accepts computers and TVs by drop-off only at all six of the City's Sanitation Convenience Centers. In spring 2015, the City discontinued supplemental e-waste collection at HHW events. These changes to e-waste collection were not expected to significantly impact the amount of e-waste collected in the City, since about 95% of e-waste was already collected through the Convenience Centers.

Figure 1-5 presents historical information on the quantity of materials collected and Figure 1-6 presents historical information on participation in the City's HHW program (FY 1996 through FY 2015). Figure 1-7 presents information on the representative composition of HHW collected in Philadelphia. Table 1-6 presents the most recent HHW and e-waste participation and collection data (FY 2016).

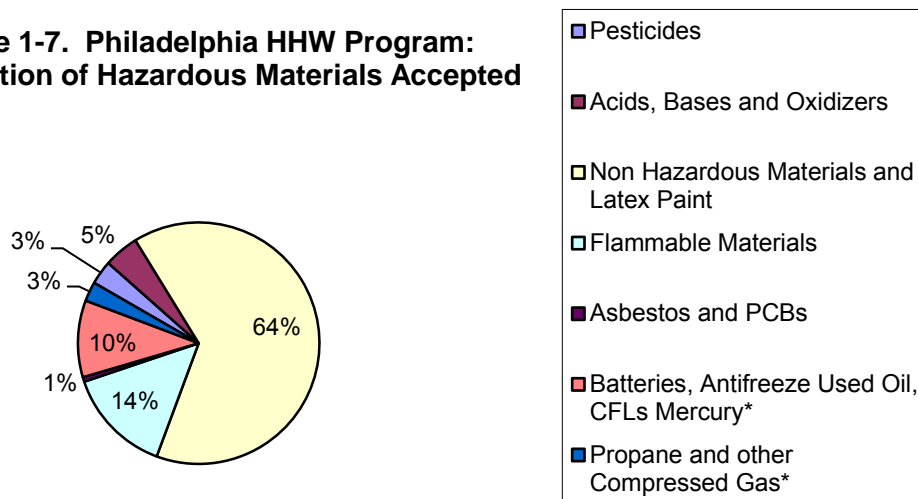
**Figure 1-5. Philadelphia HHW Program:
 Quantity of HHW, Computers and TVs (Pounds)**



**Figure 1-6. Philadelphia HHW Program:
 Participation**



**Figure 1-7. Philadelphia HHW Program:
Composition of Hazardous Materials Accepted**



*Materials Recycled

Table 1-6. HHW Program Overview – FY 2016

HHW Event Location	Event Date	Participants	Quantity of Materials (pounds)		
			Hazardous Materials	E-Waste ⁽¹⁾	Total
State Road and Ashburner	16-Jul-15	561	36,440	0	36,440
22 nd and York	19-Sep-15	384	24,934	0	24,934
63 rd Street	10-Oct-15	395	28,158	0	28,158
Delaware and W heatsheaf	7-Nov-15	535	38,412	0	38,412
State Road and Ashburner	23-Apr-16	970	63,033	0	63,033
1 st Highway Yard 4800 Parkside Ave	14-May-16	265	17,210	0	17,210
Domino and Umbria	11-Jun-16	622	40,437	0	40,437
At Convenience Centers (estimated)	Year-Round			1,093,021	1,093,021
TOTAL		3,731	248,624	1,093,021	1,341,645

1. Collection of e-waste at HHW events was discontinued effective April 2015.

1.6.4 Tires

State regulations governing the storage and transportation of residual waste also deal specifically with tires (including storage requirements, recordkeeping and reporting requirements, and a landfill ban on whole tires). The City accepts automotive tires from residents at the Sanitation Convenience Centers, limited to four tires per resident per day. In addition, the City has implemented an annual Tire Round-Up Program, which is a partnership between the City and volunteer groups to collect illegally discarded tires. Under the program, volunteer groups register with the City to collect tires during a cleanup schedule established by the Philadelphia More Beautiful Committee. Registered groups are paid \$0.50 for each illegally discarded tire the group collects and delivers to temporary drop-off sites established across the City. Throughout the year, the Streets Department collects other illegally discarded tires that are reported or that it otherwise finds along the roads. In 2015 the City collected and disposed of approximately 1,500 tons tires, all of which were delivered to Covanta Delaware Valley.

1.6.5 Ash from Resource Recovery Facilities

The PADEP Bureau of Waste Management, Division of Reporting and Fee Collection reports that 107 tons of ash residue was generated in Philadelphia in 2015 and disposed at the Tullytown Resource Recovery Facility Landfill.

1.6.6 Biosolids

The Philadelphia Water Department (PWD) operates three water pollution control plants (WPCPs) in the City. They are the Northeast WPCP, the Southeast WPCP, and the Southwest WPCP. The combined design capacity of the three plants is 522 million gallons per day (MGD) of wastewater flow. These wastewater treatment plants serve a population of 2.3 million people, of which seventy percent (70%) are City residents.

Biosolids generated by the WPCPs are processed at the Biosolids Recycling Center (BRC), which is located at 7800 Penrose Ferry Road, adjacent to the Southeast WPCP. The quantity of biosolids generated each year is approximately 220,000 wet tons per year at 30% solids. This is equivalent to approximately 66,000 dry tons per year, an amount which reflects the ability of the BRC to efficiently capture the solids. Notably, the quantity of biosolids generated can fluctuate based on average wastewater flow during the year. For example, in fiscal year 2014, the BRC processed 220,476 wet tons of biosolids and produced 60,537 dry tons of solids. In fiscal year 2015, 217,955 wet tons were processed and 56,624 dry tons of solids were produced. The average wastewater flow for fiscal year 2015 was lower than fiscal 2014.

The BRC was operated directly by the City from 1990 until 2008. Since October 2008, the BRC has been contract operated by Synagro Technologies through the Philadelphia Biosolids Services (PBS) company. Currently, the biosolids are dewatered using centrifuges to 30% solids; the dewatered sludge cake is dried and pelletized, resulting in Granulite that is produced and marketed by Philadelphia

Renewable Bio-Fuel (PRBF). The dried sludge pellets are used as a fuel source for Lehigh Cement and as fertilizer for agricultural use.

During normal operations, there is no longer any landfilling of sludge cake or dried sludge pellets. Landfilling has occurred in past years. The contract includes a contingency in case of plant shut down periods. There is a contingency for the disposal of 4,000 dry tons per year (DTPY) of sludge cake or dried sludge pellets in landfills or land applied. Permits for landfilling are maintained in PA and NJ to account for this contingency. In 2008 and 2009 combined, 13,837 tons of cake were sent to Modern Landfill in York Township, PA. During the start up of the pelletization process from December 2011 to February 2012, 2,241 tons of cake and pellet mix were sent to Grows Landfill in Morrisville, PA and 807 tons were sent to Western Berks Community Landfill in Birdsboro, PA. Currently, no cake or pellets are landfilled.

In addition to biosolids, wastewater operations at the WPCPs produce grit, screenings, and scum. The grit, screenings, and scum are known as “wastewater by-products”. The quantity of wastewater by-products generated at the WPCPs is approximately 11,000 wet tons per year. Included in this disposal figure are the solids generated by the Inlet Cleaning Unit and Sewer Maintenance Unit. Material collected from stormwater inlets and sewer cleanings is brought to the Southwest WPCP for processing.

Grit consists of sand, gravel, and metallic objects which settle in special chambers and which are scraped from the floor of the chambers for disposal. Screenings are coarse fragments trapped by bar screens at the influent gate to the plant; and usually include such items as cans, rags, and sticks. Scum largely consists of oils and grease, but also of small floatable wood and plastic pieces passing the bar screens, which are collected from the surface of the treatment tanks for separate disposal. The estimated annual quantities of these wastewater by-products from the three plants are: 8,000 tons per year of grit; 1,000 tons per year of screenings; and 1,200 tons per year of scum.

The disposition of the Wastewater By-Products is as follows: scum, grit and screenings are transported to a permitted holding area located at the Southwest WPCP. Pulverized lime is mixed with the scum, grit and screenings to reduce odors, pathogens, and free liquids. The treated Wastewater By-Products are subsequently transported to a municipal solid waste landfill for co-disposal with trash.

At the drinking water treatment plants operated by the Philadelphia Water Department, residuals generated from the raw water reservoir, flocculation/sedimentation basins, and filter backwash are collected and disposed to the City’s sanitary sewers. Therefore, the water treatment residuals are transported to the WPCPs via the sanitary sewers.

Chapter 2 – Description of Facilities

2.0 Introduction

In accordance with Section 502 (c) of Act 101 and 25 Pa. Code § 272.224, this Chapter provides a description of existing disposal and processing facilities for waste generated in the City of Philadelphia and collected by the City and by private commercial haulers. To the extent information is available, this Chapter also provides an assessment of the remaining permitted capacity of these facilities and the capacity that could be made available through reasonable expansion. In addition, this Chapter contains a list of transfer stations located in the City that handle municipal waste.

2.1 Pennsylvania Landfills and Resource Recovery Facilities

Table 2-1 presents the list of landfills and resource recovery facilities in Pennsylvania at which municipal solid waste collected within Philadelphia by the City and by private haulers was disposed in 2015. Table 2-2 presents a list of disposal facilities that are contractually available to the City for disposal (as of July 1, 2012 and continuing through June 30, 2019). Further information about these disposal agreements is provided in Section 2.3 of this Plan. Commercial waste collected by private waste haulers in Philadelphia may also have been delivered to out-of-state facilities for disposal; such data is not tracked or reported by PADEP, and is not included in this Plan. As further described in Section 2.4 of this Plan, the City has conducted a survey to identify disposal facilities that may accept privately collected waste generated in Philadelphia over the period of this Plan.

A brief description of the disposal facilities listed in Tables 2-1 and 2-2 follows.

2.1.1 IESI PA Bethlehem Landfill

IESI Bethlehem Landfill is located at 2335 Applebutter Road in Bethlehem, PA. The permit number is 100020. IESI Bethlehem Landfill is operated by IESI, which is part of Progressive Waste Solutions. IESI Bethlehem Landfill has an average daily volume of 1,375 tons per day (tpd) and a maximum daily volume of 1,800 tpd. The IESI PA Bethlehem Landfill is an Alternate Designated Disposal Facility for the City under the Covanta agreement; however, in 2015 no municipal waste from Philadelphia was delivered to the landfill.

2.1.2 Modern Landfill

Modern Landfill is located at 4400 Mt. Pisgah Road in York, PA. The permit number is 100113. Modern Landfill is operated by Republic Services. Modern Landfill has an average daily volume of 4,667 tpd and a maximum daily volume of 5,000 tpd. In 2015 212,714 tons of municipal waste from Philadelphia was delivered to Modern Landfill

Table 2-1. Pennsylvania Disposal Facilities Receiving Philadelphia Municipal Waste (2015)

Permit Number	Disposal Facility Name	Municipal Waste Disposed (tons) ⁽¹⁾
100113	Modern Landfill	212,714
100346	Pioneer Crossing Landfill	158
100620	Imperial Landfill	20
100945	Cumberland County Landfill	8
101397	Advanced Disposal Services Greentree Landfill	962
101494	Tullytown Resource Recovery Facility (Landfill)	108,311
101509	Conestoga Landfill	106,597
101615	Commonwealth Environmental Systems	21
101680	G.R.O.W.S. North Landfill	226,585
400558	Covanta Plymouth Renewable Energy	32,488
400561	York County Resource Recovery Center	43,737
400592	LCSWMA Resource Recovery Facility	21
400593	Covanta Delaware Valley	331,785
400633	Wheelabrator Falls Resource Recovery Facility	264,896
	Total ⁽²⁾:	1,328,304

1. Source: PADEP Bureau of Waste Management, Division of Reporting and Fee Collection.

2. Individual line items may not add to the total due to rounding.

Table 2-2. Pennsylvania Facilities Contractually Available for Municipal Waste Collected by or on behalf of the City of Philadelphia ⁽¹⁾

Permit Number	Facility Name	Designated Facilities ⁽⁵⁾
Waste Management		
101699	Fairless Landfill	Landfill
101680	G.R.O.W.S. North Landfill ⁽²⁾	Landfill
400633	Wheelabrator Falls Resource Recovery Facility	Resource Recovery Facility
WMGM037SE001	SpecFUEL™ Facility at Forge Recycling and Resource Recovery Center ⁽³⁾	Processing Facility ⁽⁵⁾
Covanta		
100345	Rolling Hills Landfill ⁽³⁾	Landfill
400558	Covanta Plymouth Renewable Energy	Resource Recovery Facility
400593	Covanta Delaware Valley	Resource Recovery Facility
100020	IESI PA Bethlehem Landfill ⁽³⁾	Alternate Landfill
100934	IESI PA Blue Ridge Landfill ⁽³⁾	Alternate Landfill
400561	York County Resource Recovery Center	Alternate Resource Recovery Facility
400592	LCSWMA Resource Recovery Facility (Lancaster)	Alternate Resource Recovery Facility
100758	LCSWMA Susquehanna Resource Management Complex (Harrisburg) ⁽³⁾	Alternate Resource Recovery Facility

- Contractually available to the City as of July 1, 2012 and continuing through June 30, 2019 unless otherwise noted.
- Permit expires February 15, 2019.
- Contractually available, but not reported as receiving municipal waste in 2015.
- See Section 2.3 of this Plan for additional information about facility designations.
- Facility processes mixed municipal waste to remove remaining recyclable materials, metal and PVC plastic to create an engineered fuel product that has reduced environmental air quality impacts compared to fossil fuel alternatives.

2.1.3 Rolling Hills Landfill

Rolling Hills Landfill is located at 583 Longview Road in Boyertown, PA. The permit number is 100345. Rolling Hills Landfill is operated by Delaware County Solid Waste Authority. Rolling Hills Landfill has an average daily volume of 3,200 tpd and a maximum daily volume of 3,840 tpd. The Rolling Hills Landfill is a Designated Disposal Facility for the City under the Covanta agreement; however, in 2015 no municipal waste from Philadelphia was delivered to the landfill.

2.1.4 Pioneer Crossing Landfill

Pioneer Crossing Landfill is located at 727 Red Lane Road in Birdsboro, PA. The permit number is 100346. Pioneer Crossing Landfill is operated by an entity of J.P. Mascaro & Sons, Inc. Pioneer Crossing Landfill has an average daily volume of 1,000 tpd and a maximum daily volume of 1,600 tpd. In 2015, 158 tons of municipal waste from Philadelphia was delivered to Pioneer Crossing Landfill.

2.1.5 Commonwealth Environmental Systems Landfill

Commonwealth Environmental Systems Landfill is located on E Commonwealth Avenue in Foster Township, PA. The permit number is 101615. The landfill is operated by Commonwealth Environmental Systems. It has an average daily volume of 4,750 tpd and a maximum daily volume of 5,000 tpd. In 2015, 21 tons of municipal waste from Philadelphia was delivered to Commonwealth Environmental Systems Landfill.

2.1.6 Imperial Landfill

Imperial Landfill is located at 11 Boggs Road in Imperial, PA. The permit number is 100620. Imperial Landfill is operated by Republic Services. The landfill has an average daily volume of 3,100 tpd and a maximum daily volume of 4,666 tpd. In 2015, 20 tons of municipal waste from Philadelphia was delivered to Imperial Landfill.

2.1.7 IESI Blue Ridge Landfill

IESI Blue Ridge Landfill is located at 1660 Orchard Rd in Chambersburg, PA (mailing address P.O. Box 399 Scotland, PA). The permit number is 100934. IESI Blue Ridge Landfill is operated by IESI, which is part of Progressive Waste Solutions. IESI Blue Ridge Landfill has an average daily volume of 1,700 tpd and a maximum daily volume of 2,000 tpd. The IESI Blue Ridge Landfill is an Alternate Designated Disposal Facility for the City under the Covanta agreement; however, in 2015 no municipal waste from Philadelphia was delivered to the landfill.

2.1.8 Cumberland County Landfill

Cumberland County Landfill is located at 135 Vaughan Rd .in Shippensburg, PA. The permit number is 100945. Cumberland County Landfill is operated by Advanced Disposal. Cumberland County Landfill has an average daily volume of 2,500 tpd and

a maximum daily volume of 2,950 tpd. In 2015, 8 tons of municipal waste from Philadelphia was delivered to Cumberland County Landfill.

2.1.9 LCSWMA Susquehanna Resource Management Complex

The LCSWMA Susquehanna Resource Management Complex is located at 1670 South 19th Street, Harrisburg, PA. The permit number is 100758. The facility is owned by the Lancaster County Solid Waste Management Authority and operated by Covanta Harrisburg, Inc. PADEP reports that the facility has an average daily volume of 985 tpd, but does not provide a maximum daily volume. Information available from the Energy Recovery Council indicates there are three (3) units at the facility with a combined processing capacity of 800 tpd. The facility is an Alternate Designated Disposal Facility for the City under the Covanta agreement; however, in 2015 no municipal waste from Philadelphia was delivered to the facility.

2.1.10 SpecFUEL™ Facility at the Forge Recycling and Resource Recovery Center

The Forge Recycling and Resource Recovery Center is located at 5245 Beligh Avenue in Philadelphia, PA. It is the location of the Waste Management SpecFUEL™ facility. The SpecFUEL™ Facility is a Designated Disposal Facility for the City under the Waste Management agreement; however, in 2015 no municipal waste from Philadelphia was delivered to the SpecFUEL™ facility for disposal.

2.1.11 Advanced Disposal Services Greentree Landfill

The Greentree Landfill is located at 635 Toby Rd in Kersey, PA. The permit number is 101397. It is operated by Advanced Disposal Services. The landfill has an average daily volume of 5,500 tpd and a maximum daily volume of 6,000 tpd. In 2015, 962 tons of municipal waste from Philadelphia was delivered to the Greentree Landfill.

2.1.12 Fairless Landfill & Tullytown Resource Recovery Facility

The Fairless Landfill (permit number 101699) and the Tullytown Resource Recovery Facility (permit number 101494) are located at 1000 New Ford Mill Rd. in Morrisville, PA. Both landfills are operated by Waste Management. PADEP reports that in combination, the Tullytown Resource Recovery Facility, the Fairless Landfill and the G.R.O.W.S. North Landfill have an average daily volume of 18,333 tpd and a maximum daily volume of 20,000 tpy. In 2015, the City and/or private haulers delivered 108,311 tons of municipal waste from Philadelphia to the Tullytown Resource Recovery Facility. The landfill has since closed. The Fairless Landfill is a Designated Disposal Facility for the City under the Waste Management agreement.

2.1.13 Conestoga Landfill

Conestoga Landfill is located on Harvey and Shiloh Road in Morgantown, PA. The permit number is 101509. Conestoga Landfill is operated by Republic Services. Conestoga Landfill has an average daily volume of 5,210 tpd and a maximum daily

volume of 10,000 tpd. In 2015, 106,597 tons of municipal waste from Philadelphia was delivered to Conestoga Landfill.

2.1.14 G.R.O.W.S. North Landfill

G.R.O.W.S. North Landfill is located at 1000 New Ford Mill Rd. in Morrisville, PA. The permit number is 101680. G.R.O.W.S. North Landfill is operated by Waste Management. PADEP reports that in combination, the Tullytown Landfill, the Fairless Landfill and the G.R.O.W.S. North Landfill have an average daily volume of 18,333 tpd and a maximum daily volume of 20,000 tpy. The G.R.O.W.S. North Landfill is a Designated Disposal Facility for the City under the Waste Management agreement. In 2015, the City and/or private haulers delivered 226,585 tons of municipal waste from Philadelphia to the G.R.O.W.S. North Landfill.

2.1.15 Covanta Plymouth Renewable Energy

Covanta Plymouth Renewable Energy is located at 1155 Conshohocken Rd, Conshohocken, PA. The permit number is 400558. Covanta Plymouth Renewable Energy is owned and operated by Covanta Plymouth Renewable Energy. Covanta Plymouth Renewable Energy has an average daily volume of 2,520 tpd; the maximum daily volume is not provided in the PADEP database. Information available from the Energy Recovery Council indicates there are two (2) units at the facility with a combined processing capacity of 1,216 tpd. Covanta Plymouth Renewable Energy is a Designated Disposal Facility for the City under the Covanta agreement. In 2015, the City and/or private haulers delivered 32,488 tons of municipal waste from Philadelphia to the facility.

2.1.16 York Resource Recovery Center

The York Resource Recovery Center is located at 2700 Blackbridge Rd, York, PA. The permit number is 400561. The York Resource Recovery Center is owned by the York County Solid Waste Authority and operated by Covanta York Renewable Energy, LLC. York Resource Recovery Center has an average daily volume of 1,344 tpd; the maximum daily volume is not provided in the PADEP database. Information available from the Energy Recovery Council indicates there are three (3) units at the facility with a combined processing capacity of 1,344 tpd. The York County Resource Recovery Center is an Alternate Designated Disposal Facility for the City under the Covanta agreement. In 2015, the City and/or private haulers delivered 43,737 tons of municipal waste from Philadelphia to the facility.

2.1.17 LCSWMA Resource Recovery Facility

The LCSWMA Resource Recovery Facility is located at 1911 River Road, Marietta, PA. The permit number is 400592. The facility is owned by the Lancaster County Solid Waste Management Authority (LCSWMA) and operated by Covanta Lancaster, Inc. The facility has an average daily volume of 1,200 tpd; the maximum daily volume is not provided in the PADEP database. Information available from the Energy Recovery Council indicates there are three (3) units at the facility with a combined processing capacity of 1,200 tpd. The LCSWMA Resource Recovery

Facility is an Alternate Designated Disposal Facility for the City under the Covanta agreement. In 2015, the City and/or private haulers delivered 21 tons of municipal waste from Philadelphia to the facility.

2.1.18 Wheelabrator Falls, Inc.

Wheelabrator Falls, Inc. is located at 1201 New Ford Mill Rd. in Morrisville, PA. The permit number is 400633. Wheelabrator Falls, a municipal waste-to-energy facility, is owned and operated by Wheelabrator Technologies. Wheelabrator Falls has an average daily volume of 2,800 tpd as provided in the PADEP database. Information available from the Energy Recovery Council indicates there are two (2) units at the facility with a combined processing capacity of 1,500 tpd. Wheelabrator Falls is a Designated Disposal Facility for the City under the Waste Management agreement. In 2015, the City and/or private haulers delivered 264,896 tons of municipal waste from Philadelphia to the facility.

2.1.19 Delaware Valley Resource Recovery Facility

The Delaware Valley Resource Recovery Facility is located at 10 Highland Ave., Chester, PA. The permit number is 500593. The Delaware Valley Resource Recovery Facility is owned and operated by Covanta Delaware Valley, L.P. The Delaware Valley Resource Recovery Facility has an average daily volume of 4,745 tpd, and a maximum daily volume of 5,700 tpd. Information available from the Energy Recovery Council indicates there are six (6) units at the facility with a combined processing capacity of 3,348 tpd. Covanta Delaware Valley is a Designated Disposal Facility for the City. In 2015, the City and/or private haulers delivered 331,785 tons of municipal waste from Philadelphia to the facility.

2.2 Transfer Stations and Processing Facilities

Transfer Stations located in the City of Philadelphia are listed in Table 2-3. The NW Transfer Station is owned and operated by the City of Philadelphia. The 58th Street Transfer Station, the Girard Point Transfer Station (backup), the Forge Transfer Station, and the Philadelphia Transfer Station are designated transfer stations contractually available to the City as of July 1, 2012 and continuing through June 30, 2019.

Table 2-3. Transfer Stations in Philadelphia ⁽¹⁾

Primary Facility ID	Transfer Station	Address
483498	58 th Street Transfer Station	2209 South 58 th St.
716195	American C&D Logistics	3604 South Penrose Ferry Ave.
482434	Burns, Richard S. & Co.	4300 Rising Sun Ave.
483453	City of Philadelphia Streets Department NW Transfer Station	5201 Umbria St.
277705	Forge Recycling and Transfer Station with WM SpecFUEL™ Facility	5245 Bleigh Ave.
544388	Girard Point Transfer Station	3600 South 26 th St.
512634	Philadelphia Transfer & Recycling Facility	3605 Grays Ferry Ave.
482039	Quick-Way, Inc.	2960 Orthodox St.
294707	TRC, Inc.	2904 South Delaware Ave.
483677	United States Recycling, Inc.	6101 Tacony St.

1. http://files.dep.state.pa.us/Waste/Bureau%20of%20Waste%20Management/WasteMgtPortalFiles/SolidWaste/Municipal_Waste/mwts.xls

2.3 City of Philadelphia Waste Transfer and Disposal Agreements

In 2011, the City of Philadelphia Department of Streets, with the advice of the SWRAC, developed and issued a Request for Proposals (RFP) for disposal capacity for City-collected municipal waste. The City evaluated responses to that RFP from vendors of transfer stations and disposal capacity in consideration of cost, environmental impact, neighborhood impact, and operational efficiency. Based on the evaluation, the City entered into waste transfer and disposal agreements with Waste Management of Pennsylvania, Inc. and Covanta 4 Recovery, L.P. These agreements commenced on July 1, 2012, and are for a base period of four (4) years with, at the City's option, three (3) one (1) year renewal periods. The seven-year contract terms, inclusive of all renewal options, will expire on June 30, 2019. The agreements provide the City with disposal capacity for at least 598,000 tpy of City-collected municipal solid waste through June 30, 2019. The City ordinances authorizing the Streets Commissioner to enter into the agreements with Covanta and Waste Management (Bill Nos. 120393 and 120394, respectively) and the corresponding agreements are further discussed in Chapter 9, Ordinances and Resolutions.

2.3.1 Waste Management of Pennsylvania, Inc. (Waste Management)

The City's waste transfer and disposal agreement with Waste Management identifies the Forge Recycling and Transfer Station and the Philadelphia Transfer Station and Recycling Center as Designated Transfer Stations. Both of these facilities are located in Philadelphia and are owned and operated by Waste Management.

In addition, the agreement specifies that Waste Management shall use reasonable best efforts to obtain permits and construct the WM SpecFUEL™ Technology at the Forge Recycling and Transfer Station. The SpecFUEL™ Technology consists of machinery and infrastructure to separate recyclables, remove organics, PVC, and other elements from the solid waste stream, extract materials of value from the remaining waste stream and pelletize those materials into solid fuel pellets for use in various combustion systems.

The City has the right to deliver a maximum daily quantity of 600 tpd of municipal solid waste to the Philadelphia Transfer Station and 1,150 tpd to the Forge Transfer Station and/or WM SpecFUEL™ Facility. This provides disposal capacity for the City for at least 455,000 tons per year of municipal solid waste. For each renewal term the City may adjust the maximum daily quantity to reflect changes in the quantity of waste collected by the City including demographic changes, source reduction, recycling, changed collection practices, and legal or regulatory changes, among other factors. The guaranteed annual quantity of waste to be delivered by the City to Waste Management is 117,000 tons per year (tpy) at the Philadelphia Transfer Station and 224,250 tpy at the Forge Transfer Station and/or WM SpecFUEL™ Facility. This guaranteed annual quantity is subject to change corresponding to any adjustment to the maximum daily quantity.

Final disposal of municipal waste delivered by or on behalf of the City to Waste Management must be at one of four Designated Disposal Facilities. These facilities are the Fairless Landfill, the G.R.O.W.S. North Landfill, the Wheelabrator Falls Resource Recovery Facility, and the WM SpecFUEL Facility.

2.3.2 Covanta 4 Recovery, LP (Covanta)

The City's waste transfer and disposal agreement with Covanta identifies the 58th Street Transfer Station as the Designated Transfer Station. The Girard Point Transfer Station may be utilized as a backup facility. Both of these facilities are located in Philadelphia and operated by Covanta.

Designated Disposal Facilities specified in the agreement for the final disposal of municipal solid waste delivered by or on behalf of the City to Covanta include the Covanta Delaware Valley Resource Recovery Facility in Chester, the Montgomery County Resource Recovery Facility in Conshohocken (Covanta Plymouth Renewable Energy), and the Rolling Hills Landfill in Boyertown.

Alternate Designated Disposal Facilities identified in the agreement are the Covanta York Resource Recovery Facility, the LCSWMA Resource Recovery Facility, the LCSWMA Susquehanna Resource Management Complex, the IESI Bethlehem Landfill, and the IESI Blue Ridge Landfill. Alternate Designated Disposal Facilities may be used by the City if Covanta is unable to fulfill its obligations under the Agreement.

The City has the right to deliver a maximum daily quantity of 250 tpd to the Delaware Valley Resource Recovery Facility or the Montgomery County Resource Recovery Facility, and 300 tpd to the 58th Street Transfer Station. This provides disposal

capacity for the City for at least 143,000 tons per year of municipal solid waste. For each renewal term the City may adjust the maximum daily quantity to reflect changes in the quantity of waste collected by the City including demographic changes, source reduction, recycling, changed collection practices, and legal or regulatory changes, among other factors. The guaranteed annual quantity of waste to be delivered by the City to Covanta is 48,750 tons per year to Delaware Valley or Montgomery, and 58,500 tons per year to the 58th Street Transfer Station.

2.4 Inventory of Disposal Facilities for Privately-Collected Municipal Waste

In 2015 there were 14 Pennsylvania disposal facilities that accepted approximately 1.3 million tons of municipal waste generated in Philadelphia (see Table 2-1). This quantity is equivalent to about 5,100 tons per day of waste (based on 260 days per year). Of the total quantity of municipal waste generated in Philadelphia and disposed in 2015, approximately 0.4 million tons (about 1,800 tons per day) was collected by the City. The City has Transfer and Disposal Agreements in place for acceptance of City-collected municipal waste (see Section 2.3). The remaining municipal waste that was disposed (0.9 million tons, or about 3,300 tons per day) was collected by private haulers. The City does not have flow control over privately-collected waste; it allows private haulers to deliver waste for processing or disposal to any permitted facility.

To assure that there is adequate disposal capacity for both City-collected and privately-collected municipal waste generated in Philadelphia, the City has projected future quantities of municipal waste that will require disposal (see Chapter 3 of this Plan) and the Streets Department has conducted a survey to identify disposal facilities that plan to accept privately-collected municipal waste and desire to be listed in this Plan. The survey was available on the City's website between April 2015 and October 2015. In July 2015, a public notice was placed in the trade magazine Biocycle (see copy in Appendix D) and a copy was given to DEP for publication in the PA Bulletin. In September 2017, facilities that responded to the City's 2015 survey and provided disposal capacity certifications were contacted to confirm and update certifications through 2027. Table 2-4 lists the name, location and permit number of the facilities that responded to the Survey, as updated by the City's confirmation of information in 2017.

The City's survey requested information on the location and permitted capacity of the disposal facilities, the remaining available permitted capacity, the permit expiration date, planned expansions, and the capacity that could be committed to waste generated and collected in Philadelphia. The City's survey also requested completion of a form, certifying and representing that the respondent is the owner and/or operator of the disposal facility and that it can provide disposal capacity for privately collected municipal waste generated within Philadelphia. The majority of survey respondents completed the certification form in 2015 and then updated the form following the City's request in September 2017. Appendix D provides the information reported by the disposal facilities in response to the survey as well as the updated certification forms provided to the City between September 2017 and March 2018.

Based on an evaluation of the survey information provided by the disposal facilities, these facilities had an aggregated remaining permitted disposal capacity on the order of 13.1

million tons in 2015 (i.e., at the time of the survey), diminishing to about 7.4 million tons in the later years of the Plan. This analysis assumes that existing permits that expire during the Plan period will be renewed if capacity remains at the time of permit expiration. Several of the disposal facilities reported that an expansion is planned, underway, and/or approved. Accounting for the expansion capacity, the aggregated disposal capacity is projected to remain above 10 million tons.

Recognizing that some of the remaining disposal capacity may be committed to other parties and may not be available for municipal waste generated in Philadelphia and requiring disposal, the survey asked how much capacity could be available for waste generated in Philadelphia and whether disposal facilities would be willing to sign a certification of available disposal capacity. Most of the survey respondents provided the requested certification of disposal capacity for waste generated in Philadelphia. Disposal capacity certification forms provided in 2015 were subsequently updated by the facilities between September 2017 and March 2018. Table 2-5 tabulates the aggregate disposal capacity certified by 21 disposal facilities. For 2018 through 2025, more than 1.7 million tons of disposal capacity has been certified to be available for waste generated in Philadelphia, decreasing to about 1.5 million tons of disposal capacity in 2026 and 2027. This certified disposal capacity exceeds the projected quantity of municipal waste that will require disposal (see Chapter 3 of this Plan, which projects no more than 1.4 million tons per year of municipal waste will require disposal).

The City does not have flow control over privately-collected waste, and therefore could not enter into any agreements with disposal facilities guaranteeing the delivery of privately-collected waste. However, the City's survey results demonstrate that there is sufficient disposal capacity available for the projected quantity of waste that may be generated and collected in Philadelphia for disposal through the planning period, including waste collected by private haulers. Table 2-4 identifies the disposal facilities that responded to the City's survey to be included in this Plan as a potential disposal location for municipal waste generated in Philadelphia.

Table 2-4. Disposal Facility Survey ⁽¹⁾

Facility Name	County	State	Permit Number	2017 Certification ⁽²⁾
Advanced Disposal Chestnut Valley Landfill	Fayette	PA	101419	No
Advanced Disposal Greentree Landfill	Elk	PA	101397	Yes
Advanced Disposal Mostoller Landfill, LLC	Somerset	PA	101571	Yes
Alliance Sanitary Landfill	Lackawanna	PA	100933	Yes
Blue Ridge Landfill	Franklin	PA	100934	No
Commonwealth Environmental Systems, L.P.	Schuylkill	PA	101615	Yes
Community Refuse Services Inc	Cumberland	PA	100945	Yes
Conestoga Landfill	York	PA	101509	Yes
Covanta 58 th St Transfer Station	Philadelphia	PA	101477	No
Covanta Delaware Valley Res. Rec. Facility	Delaware	PA	400593	No
Covanta Plymouth	Montgomery	PA	400558	No
Delaware Recyclable Products	New Castle	DE	SW-05/01	Yes
Fairless Landfill	Bucks	PA	101699	Yes
FR&S, Inc dba Pioneer Crossing Landfill	Berks	PA	100346	Yes
G.R.O.W.S. Landfill	Bucks	PA	101680	Yes
IESI Bethlehem Landfill	Northampton	PA	100020	No
Keystone Sanitary Landfill, Inc.	Lackawanna	PA	101247	Yes
Lancaster Waste-to-Energy Facility	Lancaster	PA	400592	Yes
Lycoming County Landfill	Lycoming	PA	100963	Yes
McKean County Landfill	McKean	PA	100361	Yes
Modern Landfill	York	PA	100113	Yes
Mountainview Reclamation Landfill	Franklin	PA	101100	Yes
Seneca Landfill, Inc.	Butler	PA	100403	Yes
Susquehanna Res. Management Complex	Dauphin	PA	100758	Yes
Tullytown Res. Rec. Facility Landfill	Bucks	PA	101494	No
Wayne Township Landfill	Clinton	PA	100955	Yes
Western Berks Community Landfill	Berks	PA	100739	No
Wheelabrator Falls Inc.	Bucks	PA	400633	Yes
Wheelabrator Gloucester Company, L.P. ⁽³⁾	Gloucester	NJ	133564	Yes
York County Resource Recovery Center	York	PA	400561	No

1. Disposal facilities listed in this table responded to the City's 2015 survey seeking identification of potential disposal capacity for municipal solid waste generated in Philadelphia and collected by private haulers.
2. Disposal facilities identified by "Yes" completed the City's form, "Certification of Municipal Waste Disposal Capacity" as updated beginning in September 2017 and continuing through March 2018. Signed certification forms are provided in Appendix D.
3. Wheelabrator Gloucester did not respond to the City's 2015 Survey, but following the City's request in September 2017 to update information provided a capacity certification form.

Table 2-5. Disposal Capacity Certification (tons per year) ⁽¹⁾

Facility Name	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Advanced Disposal Greentree Landfill	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Advanced Disposal Mostoller Landfill	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Alliance Sanitary Landfill	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Commonwealth Environmental Systems	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Community Refuse Services	31,300	31,300	31,300	31,300	31,300	31,300	31,300	31,300	31,300	31,300
Conestoga Landfill	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000
Delaware Recyclable Products	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
Fairless Landfill	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000
FR&S, Inc dba Pioneer Crossing Landfill	107,100	107,100	107,100	107,100	107,100	107,100	107,100	107,100	107,100	107,100
G.R.O.W.S. Landfill	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Keystone Sanitary Landfill	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
Lancaster Waste-to-Energy Facility	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Lycoming County Landfill	92,100	92,100	92,100	92,100	92,100	92,100	92,100	92,100	92,100	92,100
McKean County Landfill	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Modern Landfill (2)	250,000	250,000	250,000	250,000	250,000	250,000	250,000	250,000	0	0
Mountainview Reclamation Landfill	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
Seneca Landfill	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Susquehanna Res. Management Complex	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Wayne Township Landfill	6,240	6,240	6,240	6,240	6,240	6,240	6,240	6,240	6,240	6,240
Wheelabrator Falls	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Wheelabrator Gloucester	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Total Disposal Capacity Committed (tpy)	1,757,740	1,757,740	1,757,740	1,757,740	1,757,740	1,757,740	1,757,740	1,757,740	1,507,740	1,507,740

1. Based on updated certification forms completed by facilities between September 2017 and March 2018 (see forms in Appendix D).
2. All facilities provided certification of disposal capacity through 2027 with the exception of the Modern Landfill, for which disposal capacity certification was provided through 2025.

Chapter 3 – Estimated Future Capacity

3.0 Estimating Future Disposal Capacity Needs for Municipal Waste

Section 502 of Act 101 requires that municipal waste management plans include an estimate of the quantity of municipal waste that will be generated annually for each year of the plan, and an analysis of the potential need for disposal capacity. For the purpose of determining how much disposal capacity is needed, the City has tabulated disposal and recycling records for 2007 through 2015 to project future net discards and gross generation of municipal waste quantities. Net discards represent the waste that is disposed. Gross generation includes waste that is disposed plus material that is recycled. Projections do not include C&D waste, residual waste, sewage sludge (biosolids), ash residue, infectious waste or asbestos, which are accounted for separately from municipal waste.

Waste and recycling quantities are presented for both residential sources and commercial sources. As described in Chapter 1, residential sources are primarily collected by the City's Streets Department and include single-family homes and buildings in residential areas with six units or less, as well as the Philadelphia Housing Authority, some small businesses, street cleaning debris, and litter basket collections. Commercial sources are primarily collected by private haulers and include most commercial establishments, large institutional buildings, apartment buildings and condominium complexes.

3.1 Historical Trends for Municipal Waste

3.1.1 Disposal Quantities (Net Discards)

Table 3-1 summarizes the amount of municipal solid waste that was disposed of from 2007 through 2015 (net discards). As noted above, the data in Table 3-1 does not include C&D waste or other waste types that are accounted for separately from municipal waste.

Table 3-1. Municipal Waste Disposed 2007 – 2015⁽¹⁾ (Net Discards)

Year	Residential Waste Disposed (tons)	Commercial Waste Disposed (tons)	Total Waste Disposed (tons)
2007	641,724	1,185,701	1,827,425
2008	612,419	1,060,976	1,673,395
2009	559,907	878,928	1,438,835
2010	528,793	866,751	1,395,544
2011	530,779	859,663	1,390,442
2012	520,000	771,072	1,291,072
2013	498,024	818,167	1,316,191
2014	496,754	819,998	1,316,752
2015	459,330	868,974	1,328,304

1. Based on hauler reports compiled by the City for purpose of reporting data to PADEP. Data may differ somewhat from PADEP reports due to the City's need to estimate certain commercial data that is not reported in a timely way by some private haulers and/or that is incomplete.

As shown in Table 3-1, the total annual quantity of municipal waste disposed has declined from a high of more than 1.8 million tons in 2007 down to approximately 1.3 million tons in each of the past four years.

3.1.2 Recycling Quantities

Table 3-2 summarizes the amount of municipal solid waste that was recycled from 2007 through 2015. As noted above, the data in Table 3-2 does not include C&D waste that was recycled, since C&D waste is accounted for separately from municipal waste.

Table 3-2. Municipal Waste Recycled 2007 – 2015⁽¹⁾

Year	Residential Waste Recycled (tons)	Commercial Waste Recycled (tons)	Total Waste Recycled (tons)
2007	49,243	764,040	813,283
2008	54,992	834,139	889,131
2009	74,797	764,119	838,916
2010	90,475	915,603	1,006,078
2011	105,248	973,635	1,078,883
2012	122,680	841,636	964,316
2013	126,263	717,692	843,955
2014	126,720	681,551	808,271
2015 ⁽²⁾	116,553	801,795	918,348

1. Includes all materials reported by the Streets Department to PADEP in its annual recycling report. Data may differ somewhat from PADEP reports due to the City's need to estimate commercial data that is not reported in a timely way by some private haulers, and/or that is incomplete.
2. The commercial recycling quantity for 2015 is an estimated value based on data reported by private entities and adjusted by the City using representative data from 2014 to account for metal recycling not reported. The data discrepancy is believed to be due to stockpiling of material collected as a result of unfavorable market values in 2015.

As shown in Table 3-2, the annual quantity of City-collected residential recycling increased annually from 2007 until 2014. In 2015, the quantity of City-collected residential recycling decreased. However, the total tons disposed also decreased in 2015 resulting in a calculated recycling rate that was similar to the rate achieved in 2014 (just over 20%). Additional information on the City's recycling program, including factors that have contributed to the historical increases in residential recycling, is presented in Chapter 4 of this Plan.

Data presented in Table 3-2 shows that commercial recycling increased from 2007 through 2011, followed by declining quantities from 2012 through 2014. However, the City believes that commercial recycling quantities may be under-reported for the past several years due to haulers stockpiling materials such as ferrous metals during market downturns. Commercial recycling data for 2015 includes an estimate by the City to adjust for these factors.

3.1.3 Gross Generation of Municipal Waste

Gross municipal waste generation is the quantity of municipal waste that is disposed (as tabulated in Table 3-1) plus the quantity of materials recycled (as tabulated in Table 3-2). Table 3-3 summarizes gross municipal waste generation for 2007 through 2015. As noted above, the data in Table 3-3 does not include C&D waste or other waste types that are accounted for separately from municipal waste.

Table 3-3. Gross Municipal Waste Generated 2007 – 2015

Year	Gross Residential Waste Generation (tons)	Gross Commercial Waste Generation (tons)	Total Gross Municipal Waste Generation (tons)
2007	690,967	1,949,741	2,640,708
2008	667,411	1,895,115	2,562,526
2009	634,704	1,643,047	2,277,751
2010	619,268	1,782,354	2,401,622
2011	636,027	1,833,298	2,469,325
2012	642,680	1,612,708	2,255,388
2013	624,287	1,535,859	2,160,146
2014	623,474	1,501,549	2,125,023
2015	575,883	1,670,769	2,246,652

As shown in Table 3-3, total gross municipal waste generation (including waste recycled and waste disposed from both residential and commercial sources in Philadelphia, and excluding C&D waste) has declined from approximately 2.6 million tons in 2007 to approximately 2.2 million tons in 2015.

3.2 Municipal Waste Generation Rate Forecast

For purpose of this Plan, the City has developed a municipal waste generation forecast that considers both residential and commercial gross municipal waste generation as well as recycling quantities, from which net discards requiring disposal are projected. Residential municipal waste generation rates are projected on a per-capita basis, and commercial municipal waste generation rates are projected on a per-employee basis. Population and employment forecasts from the Delaware Valley Regional Planning Commission (DVRPC) are used with the per-capita and per-employee generation rates to calculate gross municipal waste quantities for the ten-year planning period. Recycling rates for residential and commercial sources are projected based on steadily increasing recycling to achieve the City's 50% overall recycling goal by the end of the planning period. Projected net discards are calculated as gross waste minus recycling quantities. Projected net discards represent future disposal capacity estimated to be needed over the duration of the Plan.

As further discussed in Chapter 5, the SWRAC Goals and Metrics Subcommittee has begun to consider a number of objectives associated with recycling and waste diversion goals for the City, including continued efforts to improve the City's recycling program and the recently-established Zero Waste and Litter Cabinet. These future, ongoing efforts could further increase the City's recycling rate, but are not yet quantitative. Therefore, these future efforts are not reflected in the waste generation forecast to ensure disposal capacity needs are not underestimated.

3.2.1 Residential Municipal Waste Generation Rate

The most recently published population data from the DVRPC are for 2010 (based on Census data) and 2015 (Census estimate), with data forecasted by DVRPC in five-year increments through 2045 (County- and Municipal-Level Population Forecasts, 2015-2045, Analytical Data Report 022, August 2016).

For purpose of estimating gross residential municipal waste generation rates for 2010 through 2015, the DVRPC population data and projections have been linearly interpolated and are shown in Table 3-4. Table 3-4 also includes the gross residential municipal waste quantities for these years (taken from Table 3-3), and shows the calculated per-capita gross residential municipal waste generation rate for each year (tons per person per year). As shown in Table 3-4, the per-capita gross residential municipal waste generation rate has fluctuated between 0.37 and 0.41 tons per person per year over the past six years, with an average rate of 0.40 tons per person per year. For planning purposes, a reasonable estimate of the future per-capita gross residential municipal waste generation rate is the average rate of 0.40 tons per person per year.

Table 3-4. Philadelphia Residential Municipal Waste Generation Rate

Year	Philadelphia Population ⁽¹⁾	Gross Residential Waste Generation (tons)	Per-Capita Gross Residential Waste Generation Rate (tons per person per year)
2010	1,526,006	619,268	0.41
2011	1,534,293	636,027	0.41
2012	1,542,581	642,680	0.42
2013	1,550,868	624,287	0.40
2014	1,559,156	623,474	0.40
2015	1,567,443	575,883	0.37

1. Source: Delaware Valley Regional Planning Commission; County- and Municipal-Level Population Forecasts, 2015-2045, Publication No. ADR022, August 2016; mid-years linearly interpolated.

3.2.2 Commercial Municipal Waste Generation Rate

The most recently published employment data from the DVRPC are for the years 2010 and 2015, with projections in five-year increments through 2045 (Regional, County, and Municipal Employment Forecasts, 2015-2045, Analytical Data Report 023, October 2016).

For purpose of estimating gross commercial municipal waste generation rates for 2010 through 2015, the DVRPC employment data have been linearly interpolated and are shown in Table 3-5. Table 3-5 also includes the gross commercial municipal waste quantities (taken from Table 3-3), and shows the calculated per-employee gross commercial municipal waste generation rate for each year (tons per employee per year). As noted earlier in this Chapter, the commercial data does not include C&D waste or other waste types that are accounted for separately from municipal waste.

Table 3-5. Philadelphia Commercial Municipal Waste Generation Rate

Year	Philadelphia Employees ⁽¹⁾	Gross Commercial Waste Generation (tons)	Per-Employee Gross Commercial Waste Generation Rate (tons per employee per year)
2010	738,546	1,782,354	2.41
2011	745,406	1,833,298	2.46
2012	752,266	1,612,708	2.14
2013	759,127	1,535,859	2.02
2014	765,987	1,501,549	1.96
2015	772,847	1,670,769	2.16

1. Source: Delaware Valley Regional Planning Commission; Regional, County and Municipal Employment Forecasts, 2015-2045, Publication No. ADR023, October 2016; mid-years linearly interpolated.

As shown in Table 3-5, the per-employee gross commercial municipal waste generation rate has fluctuated over the past six years from about 2.0 tons per employee per year to about 2.5 tons per employee per year, with an average rate of 2.19 tons per employee per year. For planning purposes, a reasonable estimate of the future per-employee gross commercial municipal waste generation rate is the average rate of 2.19 tons per employee per year.

3.3 Recycling Rate Forecast

Using the data compiled above, Table 3-6 summarizes historical data on total gross municipal waste generated (residential and commercial) and total municipal waste recycled and calculates the annual historical recycling rate for the City of Philadelphia. As noted earlier in this Chapter, the data excludes C&D waste and other types of waste that are

handled separately from municipal waste. Although not included in the municipal recycling rate forecast, C&D waste is recycled at a very high level (approximately 90% in 2015) and measurably increases the overall recycling rate for the City. Also not included in the forecast are potential future recycling initiatives that cannot yet be quantified.

Table 3-6. City of Philadelphia Recycling Rate 2007 – 2015

Year	Total Gross Municipal Waste Generation (tons)	Total Municipal Waste Recycled (tons)	Municipal Recycling Rate ⁽¹⁾
2007	2,640,708	813,283	30.8%
2008	2,562,526	889,131	34.7%
2009	2,277,751	838,916	36.8%
2010	2,401,622	1,006,078	41.9%
2011	2,469,325	1,078,883	43.7%
2012	2,255,388	964,316	42.8%
2013	2,160,146	843,955	39.1%
2014	2,125,023	808,271	38.0%
2015	2,246,652	918,348	40.9%

1. Excludes C&D waste recycling, since C&D waste is handled separately from municipal waste.

As shown in Table 3-6, the municipal recycling rate increased from approximately 31% in 2007 to approximately 41% in 2015, with a high of almost 44% in 2011. Fluctuations over time, particularly decreases in 2013 and 2014, may be due to inaccurate and incomplete commercial recycling data that is not reported in a timely way by some private haulers. As further described in Chapters 4 and 5 of this Plan, the City intends to continue to emphasize recycling as a preferred element of its waste management hierarchy, and has identified measures that will be pursued to promote increased municipal recycling from both the residential and commercial sectors. The City is also working to increase efforts to collect more complete commercial data. For planning purposes, the City projects that efforts described in Chapters 4 and 5 of this plan will help to increase the municipal recycling rate to achieve the City's original goal of 50% and the more progressive sustainability goal of Zero Waste by 2035. Although the City will continue to pursue recycling and Zero Waste initiatives that may increase the recycling rate to greater than 50%, for planning purposes the rate is capped at 50% to avoid underestimating future disposal capacity needs. Although not incorporated into the municipal recycling numbers presented herein, the City will also continue to promote C&D recycling, which has been occurring at a very high rate.

3.4 Projected Future Gross and Net Discards

Based on the population projections and employment forecasts published by the DVRPC, and applying the municipal waste generation and recycling rates established above, the City has calculated projected gross municipal waste quantities and net discards for the planning period of 2018 through 2027. These projections are shown in Table 3-7.

**Table 3-7. City of Philadelphia
Projected Gross Municipal Waste and Net Discards
2018 – 2027**

	Base Year 2015	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Population Forecast ⁽¹⁾	1,567,443	1,583,849	1,589,318	1,594,787	1,599,193	1,603,599	1,608,004	1,612,410	1,616,816	1,622,247	1,627,678
Employment Forecast ⁽¹⁾	722,847	780,924	783,616	786,308	788,478	790,647	792,817	794,986	797,156	799,840	802,523
<u>Gross Waste (tons)</u>											
Residential ⁽²⁾	575,883	635,334	637,528	639,722	641,489	643,257	645,024	646,791	648,559	650,737	652,916
Commercial ⁽³⁾	<u>1,670,769</u>	<u>1,713,074</u>	<u>1,718,979</u>	<u>1,724,884</u>	<u>1,729,645</u>	<u>1,734,403</u>	<u>1,739,163</u>	<u>1,743,921</u>	<u>1,748,681</u>	<u>1,754,569</u>	<u>1,760,454</u>
Total Gross Waste	2,246,652	2,348,408	2,356,507	2,364,606	2,371,134	2,377,660	2,384,187	2,390,712	2,397,240	2,405,306	2,413,370
<u>Recycling Quantities</u>											
Percent Recycled ⁽⁴⁾⁽⁵⁾	40.9%	41%	42%	43%	44%	45%	46%	47%	48%	49%	50%
Tons Recycled	918,348	962,847	989,733	1,016,781	1,043,299	1,069,947	1,096,726	1,123,635	1,150,675	1,178,600	1,206,685
Net Discards Requiring Disposal	1,328,304	1,385,561	1,366,774	1,347,825	1,327,835	1,307,713	1,287,461	1,267,077	1,246,565	1,226,706	1,206,685
Certified Disposal Capacity ⁽⁶⁾		1,757,740	1,757,740	1,757,740	1,757,740	1,757,740	1,757,740	1,757,740	1,757,740	1,507,740	1,507,740

1. DVRPC data with mid-years linearly interpolated.
2. Based on a residential gross waste generation rate of 0.40 tons per person per year.
3. Based on a commercial gross waste generation rate of 2.19 tons per employee per year.
4. Excludes C&D recycling.
5. Increases in the recycling rate are shown as generally linear for long-term planning purposes, and are anticipated to be achieved with the programs and policies outlined in Chapters 4 and 5 of this Plan.
6. See disposal capacity certification summarized in Table 2-5 and documented in Appendix D.

Chapter 4 – Description of Recycling Program

4.0 Background

The City of Philadelphia has established and maintains a comprehensive and successful recycling program. In the early 1980's, the City established one of the first curbside recycling programs in the United States. Since then, the City has continuously invested in improving recycling throughout Philadelphia. The residential recycling rate continues to increase; it has almost tripled since 2007 and is currently at about 20%. The commercial recycling rate increased from about 39% in 2007 to over 50% in 2010-2012, and is currently estimated to be about 48%. The City believes that the actual commercial recycling rate may be under-reported due to the City's need to estimate commercial data that is not reported in a timely way by some private haulers and/or that may be incomplete. The C&D recycling rate has increased from about 75% in 2007 to more than 94% in 2013, and is currently estimated to be about 90%.

The City's current program provides an integrated approach for recycling in residential and commercial establishments, City buildings, schools and public places. It is supported by a strong public outreach campaign branded ***"Get Behind Recycling, Know the Ins and Outs"***. This message includes a "recycle right" theme that focuses on encouraging a high level of recycling, while keeping unacceptable items out of the collection bins to improve the efficiency of processing operations. The program was previously branded *"recycle-full-cycle: home base, work space, every place"* to promote recycling all day long, all throughout Philadelphia. The City continues to also promote this previous message that recycling shouldn't stop at home, but should continue everywhere – at work, school, and public places. The City will continue to promote its recycling program to raise awareness and educate its residents, employees, visitors and commercial establishments in recycling opportunities and protocol.

Figure 4-1. Examples of Public Outreach for Recycling



The City has developed a wide array of other resources, initiatives and incentives to support its recycling efforts, including a residential recycling rewards program (Recyclebank), outreach to civic and community organizations, recycling bin distribution locations and events, a commercial recycling toolkit, a multi-family buildings recycling toolkit, and public space recycling (BigBelly). Moreover, the City's comprehensive anti-litter campaign, "Pick It Up, Philly" has been used to promote recycling as a step towards keeping the City litter-free. In December 2015, City Council passed a new recycling ordinance that will allow for issuance of updated rules and regulations and increased fines for non-compliance (with a particular emphasis on commercial recycling). This new ordinance is expected to have a positive impact on recycling efforts. More recently, the Mayor created the Zero Waste and Litter Cabinet. The Cabinet Action Plan, released in July 2017, identified a long-term objective for Philadelphia to fully eliminate the use of landfills or conventional incinerators by 2035. To do this, Philadelphia will reduce waste generation and increase waste diversion by 90 percent by 2035 (based on 2015 waste totals) with the remaining 10 percent utilized as waste to energy. The work of the Cabinet will be further addressed in the City's Substantial Plan Revision that will be initiated in 2018.

The City has employed integrated media approaches using transit advertising, television commercials, local media print advertising, a comprehensive website with downloadable information, social media including Facebook and Twitter, collaboration with third-party websites (Recyclebank and Recycle by City) and direct mail to promote and support the City's recycling program. The City has actively engaged SWRAC in an ongoing assessment and improvement of a dynamic recycling program that can adapt to the needs of the City, and has involved various City agencies that can positively impact the ongoing success of the recycling program.

The City already exceeds the State's recycling goal of 35%, and since 2010 has been near to or exceeded 50% (a goal established in 2008 under Executive Order 15-08). For many years, the City has prioritized waste reduction and recycling within its waste management hierarchy, and continues to do so as part of this Plan. In addition, recycling was one of the center pieces of Philadelphia's 2009 Greenworks plan, which called for increasing waste reduction and recycling and strengthening efforts to curb littering. This Chapter describes Philadelphia's current recycling program and identifies benefits of recycling.

4.1 Recycling Achievements

Figure 4-2 shows the positive recycling trend achieved by the City, from 2007 through 2015, including commercial recycling, C&D recycling, and residential recycling. As shown in Figure 4-2, the City's overall recycling rate has consistently exceeded the State's recycling goal of 35%. The residential recycling rate has nearly tripled from about 7% in 2007 to more than 20% since 2013. Commercial recycling increased from about 39% in 2007 to more than 50% for 2010-2012, and is currently estimated to be about 48%. Table 4-1 presents the historical recycling data that underlies the figure. Table 4-2 presents the quantity of recyclables by material type within the City in 2015, based on data reported to PADEP.

Figure 4-2. City of Philadelphia Recycling Achievements

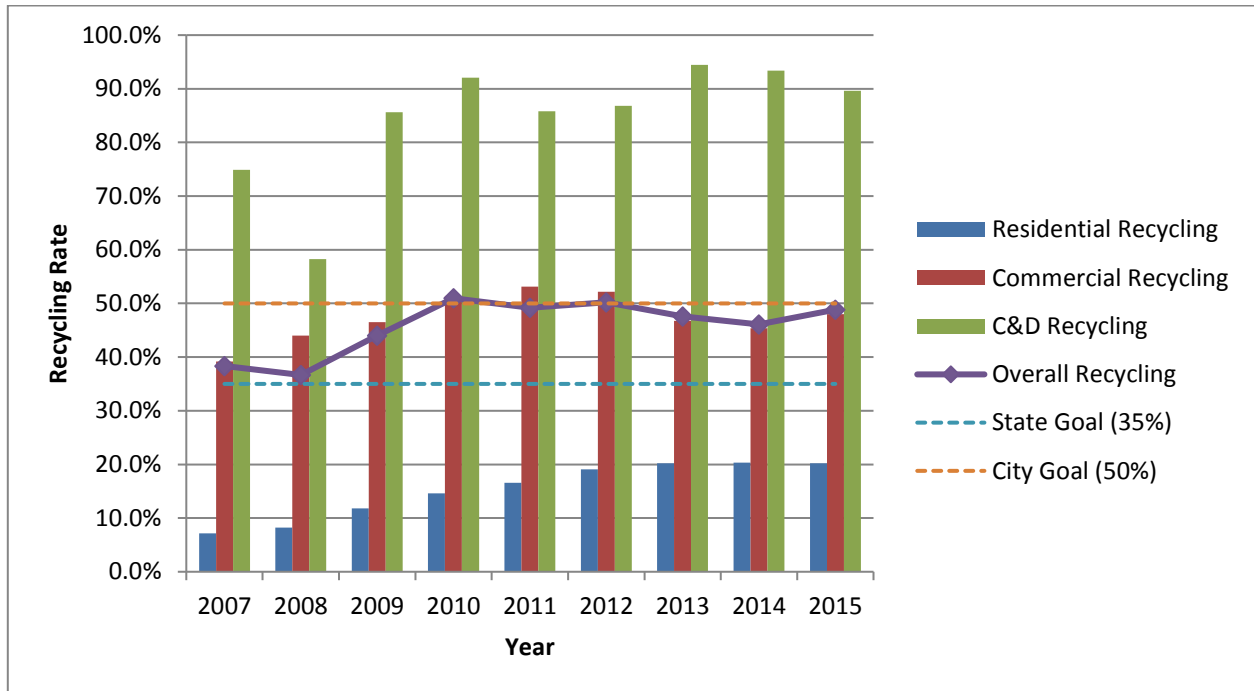


Table 4-1. City of Philadelphia Recycling Rate 2007 – 2015

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015
<u>Recycling by Sector (tons)</u>									
Commercial	764,040	834,139	764,119	915,603	973,635	841,636	717,692	681,551	801,795
C&D	407,746	136,263	336,926	487,877	318,104	399,939	369,814	339,514	393,424
Residential	49,243	54,992	74,797	90,475	105,248	122,680	126,263	126,720	116,553
Total Recycling	1,221,029	1,025,394	1,175,842	1,493,955	1,396,987	1,364,255	1,213,769	1,147,785	1,311,772
<u>Disposal by Sector (tons)</u>									
Commercial	1,185,701	1,060,976	878,928	866,751	859,663	771,072	818,167	819,998	868,974
C&D	136,822	97,638	56,577	41,875	52,595	60,728	21,737	24,153	45,699
Residential	641,724	612,419	559,907	528,793	530,779	520,000	498,024	496,754	459,330
Total Disposal	1,964,247	1,771,033	1,495,412	1,437,419	1,443,037	1,351,800	1,337,928	1,340,905	1,374,003
<u>Generation by Sector (tons)</u>									
Commercial	1,949,741	1,895,115	1,643,047	1,782,354	1,833,298	1,612,708	1,535,859	1,501,549	1,670,769
C&D	544,568	233,901	393,503	529,752	370,699	460,667	391,551	363,667	439,124
Residential	690,967	667,411	634,704	619,268	636,027	642,680	624,287	623,474	575,883
Total Generation	3,185,276	2,796,427	2,671,254	2,931,374	2,840,024	2,716,055	2,551,697	2,488,690	2,685,775
<u>Recycling Rate by Sector (% of Generation)</u>									
Commercial	39.2%	44.0%	46.5%	51.4%	53.1%	52.2%	46.7%	45.4%	48.0%
C&D	74.9%	58.3%	85.6%	92.1%	85.8%	86.8%	94.4%	93.4%	89.6%
Residential	7.1%	8.2%	11.8%	14.6%	16.5%	19.1%	20.2%	20.3%	20.2%
Overall Recycling Rate ⁽¹⁾	38.3%	36.7%	44.0%	51.0%	49.2%	50.2%	47.6%	46.1%	48.8%

1. Includes commercial recycling, C&D recycling, and residential recycling. Data may differ from that reported in other sources due to an under-reporting of commercial recycling data to PADEP.

Table 4-2. Philadelphia Recycling by Material Type (2015)

Material	Quantity Recycled (Total Tons)
White Goods ⁽¹⁾	285,989
Rubber Tires	6,650
Wood Waste	19,130
Yard and Leaf Waste	2,155
Aluminum Scrap	277
Aluminum Cans	10
Antifreeze	24
Asphalt	5,303
Cardboard	107,686
Construction and Demolition	393,424
Consumer Electronics	646
Ferrous Metals	83,023
Fluorescent Tubes and CFLs	5,503
Food Waste	345
Furniture and Furnishings	0
Batteries: Lead Acid	67
Mixed Glass	31
Mixed Metals	732
Mixed Papers	12,963
Mixed Plastic	1,514
Commingled Materials	390
Oil Filters	0
Newsprint	1,568
Batteries: Other Household Batteries	20
Non Ferrous Metals ⁽¹⁾	227,780
Office Papers	10,762
Single Stream	144,294
Steel and Bimetallic Tin Cans	40
Clothing and Textiles	10
Other: Paints, Varnishes, Pesticides	54
Misc. Other Consumer	694
Used Oil	688
Wire/Cable	0
Total Quantity Recycled	1,311,772

1. Data for white goods and non-ferrous metals is taken from 2014 data, due to significant underreporting of these materials in 2015 believed to be due, in part, to stockpiling of materials because of unfavorable market values.

4.2 Recycling Markets and Fiscal Benefits of Recycling

Among other benefits, recycling has provided fiscal benefits to the City. Figure 4-3 illustrates the City's net recycling revenues from FY 2000 through FY 2015. In FY 2012 the City earned approximately \$6.7 million in net recycling revenue, representing an all-time high for the City's recycling program. Since 2012, net recycling revenues have declined despite an increase in the quantity of recyclables collected, illustrating the volatility of recyclables markets. Despite this decline in recycling revenues, the City continues to realize fiscal benefits from recycling due to savings from avoided disposal costs.

Figure 4-3. City of Philadelphia Historical Residential Recycling Revenues

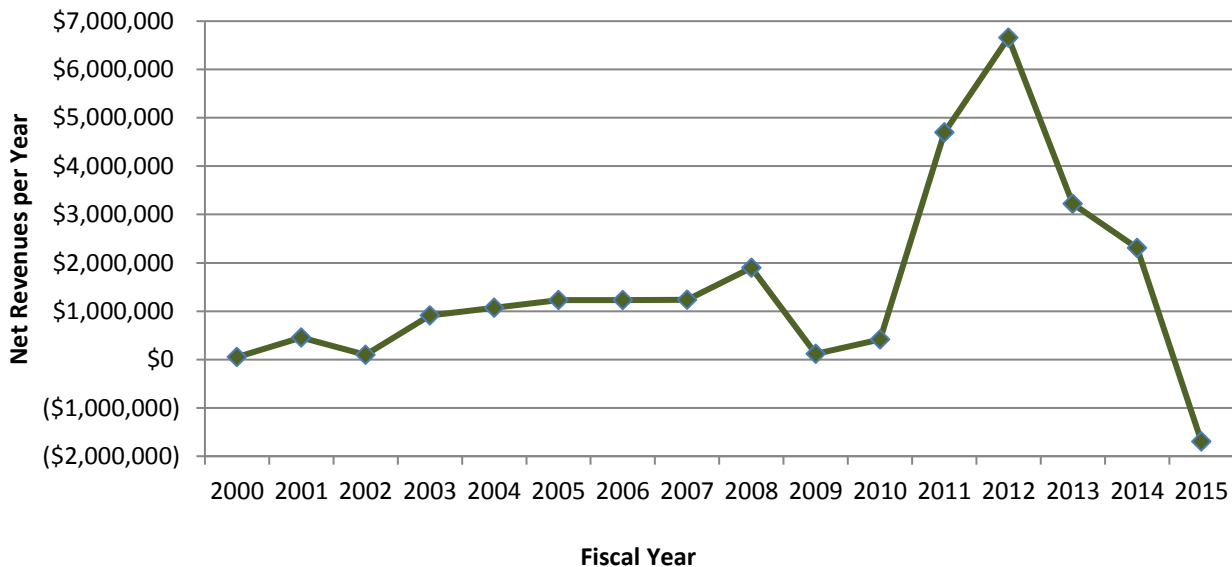
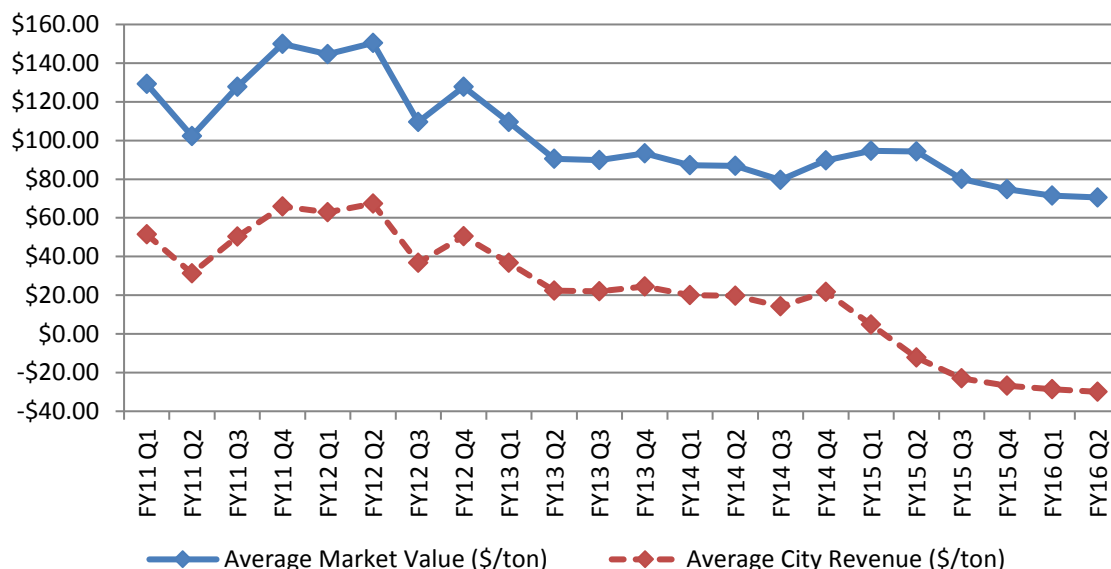


Figure 4-4 illustrates recycling market values and City revenues from FY 2011 through the second quarter of FY 2016. As shown in Figure 4-4, recycling market values and City recycling revenues peaked in FY 2012. Since then, recycling market values have declined. In addition to declining market values, the City entered into a new recyclables processing contract in the second quarter of FY 2014 (see Section 4.5). This new contract requires the City to pay for recyclables processing. The contract is tied to recovered materials commodity index prices, so increases in commodity values will lower the City's price per ton with the potential to push the rate back to a net revenue payment to the City. The contract is also tied to composition of the curbside recyclables stream, so changes to composition (especially reduction in contaminants) could also result in positive pricing movement. Currently, the City is paying over \$20 per ton for recyclables processing compared to prior years when the City received net revenue for recyclables.

Figure 4-4. Historical Recycling Market Values and City Revenues (\$/ton)



The change in recycling market values and the corresponding change in the structure of the City's recyclables processing contract are influenced by a number of factors including the following:

- Export Markets**– The Republic of China, which imports between 40 to 50 percent of all U.S. recovered materials, began enforcing tighter quality standards in recent years, including a program dubbed “Operation Green Fence” in 2013 and the “National Sword 2017” campaign. These tighter standards and inspections have helped drive prices downward, along with slower GDP growth in Chinese markets. China's announcement of a new material ban beginning in 2018, along with extremely prohibitive quality standards, created fresh uncertainty in the Chinese export markets. The impact on the market for recyclables and recycling industry in the U.S. began to be felt in 2017.
- Changes to the Composition of Recyclables Stream** – There has been a change in the makeup of the City's recyclables stream, most notably a decrease in the amount of paper and cardboard. This has magnified the influence of recyclables that have low or negative market values, especially glass that has continued to have poor market value and plastics (particularly #3-7 plastics) for which record low crude oil prices have driven down market values. Contaminants, notably plastic retailer bags, have become more of a concern as well. The recycling stream is expected to continue to change, including continued decline in newspaper circulation and packaging light-weighting.
- Market Competition** – The number of companies that can perform recyclable processing services as well as processing capacity currently available to the City is limited, and the volume of recyclables the City generates further limits the number of companies that can provide processing services meeting the City's needs.

- **Increased MRF Operating Costs** – Operations and maintenance costs for MRFs have increased over the past 10 years through the advent of more complex single-stream processing systems. Higher MRF operating costs are expected to be the “new normal”.

4.3 Non-Fiscal Benefits of Recycling

In addition to fiscal benefits, recycling provides raw materials to manufacturers and helps create green jobs, preserve natural resources, reduce energy consumption and reduce greenhouse gas (GHG) emissions. Although some of these benefits are difficult to quantify, the USEPA Waste Reduction Model (WARM) can be used to determine GHG emission reductions from the City’s single-stream recycling program. Table 4-3 shows the estimated composition of the City’s single-stream recyclables and the quantities collected in 2015. Using this data as input to the WARM model, along with other data and input assumptions as documented in Appendix E, the model calculates approximately 310,000 metric tons of carbon dioxide equivalents were avoided by the City’s single-stream recycling program (compared to landfilling the materials). This is equivalent to removing more than 65,000 passenger cars from the road. The benefits achieved by the City’s recycling program are even greater than this amount, since the single-stream recycling program is only about 11% of the total recycling achieved.

Table 4-3. Philadelphia Single-Stream Recycling Data for WARM Modeling

Material	Estimated Percentage of Single-Stream Recyclables⁽²⁾	Quantity Collected (tons, 2015)⁽²⁾
Residential Mixed Paper	27.0%	38,959
Old Corrugated Cardboard	21.3%	30,735
Aseptic Containers ⁽¹⁾	0.4%	577
Aluminum Cans	1.2%	1,732
Steel Cans	2.2%	3,174
Other Metal	1.2%	1,732
PET Plastics	5.3%	7,648
HDPE Mix	2.5%	3,607
Mixed Plastics/Rigid	2.3%	3,319
Mixed Glass	23.7%	34,198
Rejects/Residue ⁽¹⁾	13.1%	18,903
Total	100%	144,294

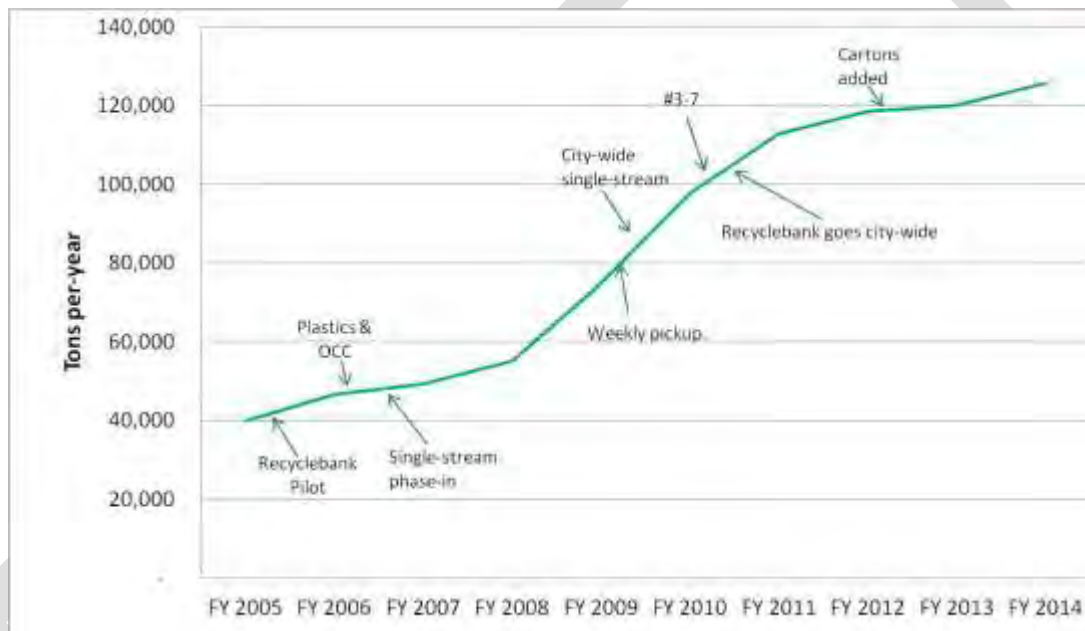
1. The WARM model does not contain a category for aseptic containers; therefore, although recycled, aseptic containers were not included in the WARM analysis. Rejects/Residue were also excluded from the WARM analysis.
2. Individual line items do not add to the total line item due to rounding.

4.4 Residential Recycling Program

The City’s recycling program began in 1984 with a curbside program to collect newspaper in one of the City’s neighborhoods. Recycling expanded over time, leading up to City-wide

mandatory curbside recycling on a bi-weekly basis in 1994. In 2006, the City began to transition to single-stream recycling. By 2009, single-stream recycling was available City-wide on a weekly collection schedule. Over time, materials have been added to the program, including #3-7 plastics in 2011 and aseptic cartons in 2012. Most recently, the program has been expanded to include metal trays and baking dishes, and clean aluminum foil. The transition to weekly, single-stream recycling and the ongoing addition of recyclable materials in the single-stream curbside program has had a positive impact on the success of the recycling program. As shown in Table 4-1, the residential recycling rate has increased since 2007. This increase is reflective of the City's continued support and expansion of the recycling program and related initiatives, and sustained residential participation. Figure 4-5 highlights the increasing trend in residential recycling correlated with the key City initiatives that have facilitated this success.

Figure 4-5. Residential Recycling Tonnages and Initiatives



Currently, the City provides weekly curbside collection of single-stream recyclables coincident with weekly trash collection. The City serves approximately 540,000 homes. The City provides recycling bins, available at the City's Sanitation Convenience Centers, and also allows residents to use any household container (up to 32 gallons) with "RECYCLING" written on it. There are no limits to the number of recycling bins that can be set out each week. The City collects the materials manually, in rear-loader packer trucks with capacities ranging from ten cubic yards to twenty-five cubic yards. Collection operations are organized into six Sanitation Areas and thirteen districts. Each District is divided into five collection days. Figure 4-6 shows a map of the collection areas and the recycling diversion rate, by area, for Fiscal Year 2007. By comparison, Figure 4-7 shows the same map with recycling diversion rates for Fiscal Year 2015. As shown in the figures, the City has significantly increased residential diversion rates. The Streets Department

estimates that currently, 60 to 70 percent of households regularly participate in the curbside recycling program.

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Figure 4-6. City of Philadelphia Collection Districts and Recycling Diversion Rates (Fiscal Year 2007)

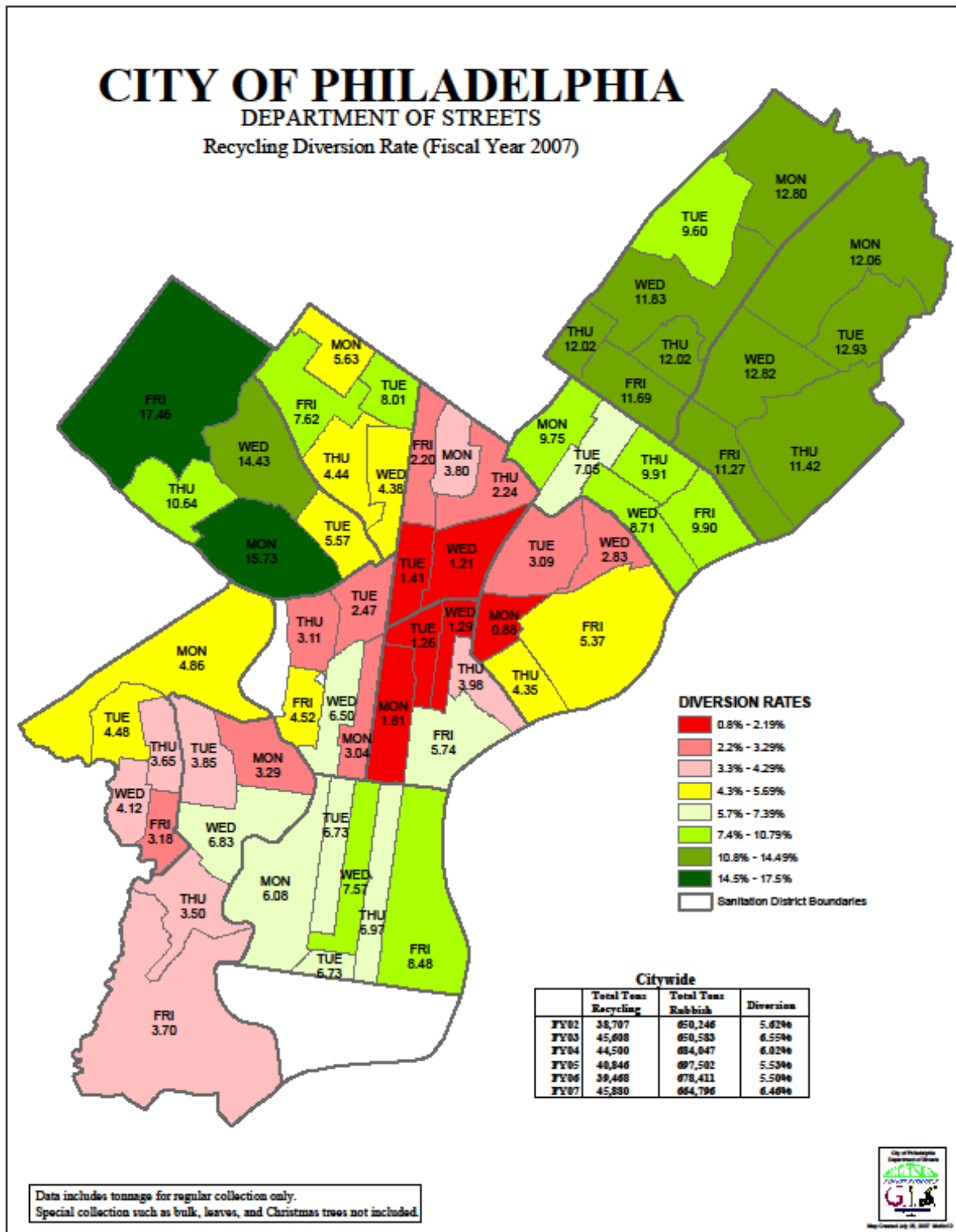
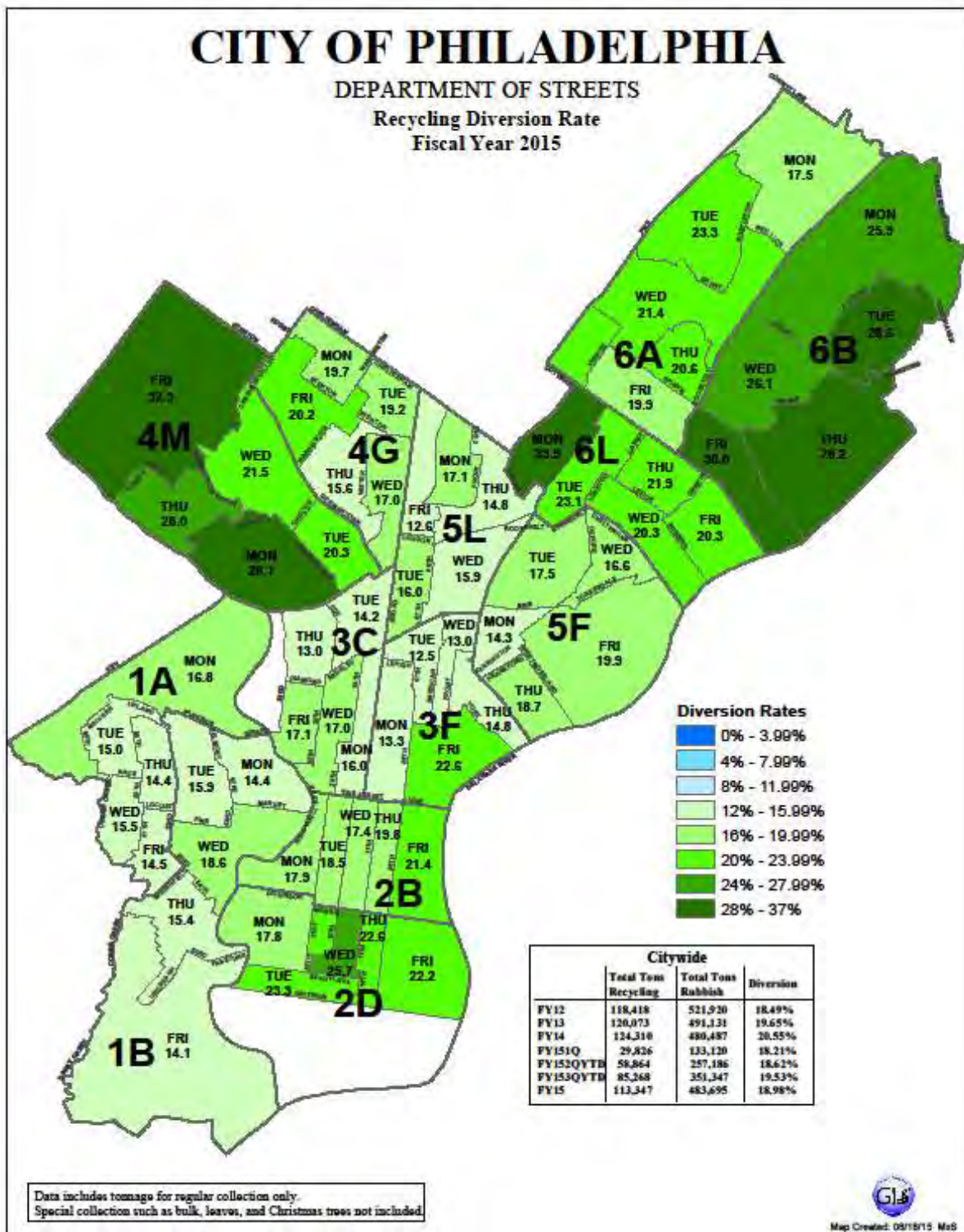


Figure 4-7. City of Philadelphia Collection Districts and Recycling Diversion Rates (Fiscal Year 2015)



In addition to providing residential curbside collection, the City also operates Sanitation Convenience Centers (drop-off centers) for City residents. The Centers accept recyclables as well as rubbish, e-waste, bulk items, yard waste, Christmas trees, automotive tires, mattresses and box springs. All locations are opened Monday through Saturday between 8 a.m. and 6 p.m., except on City holidays. Centers are strategically located throughout Philadelphia, as listed below:

Figure 4-8. City of Philadelphia Sanitation Convenience Centers

1. Northeast Philadelphia
State Road and Ashburner Street
2. Northwest Philadelphia
Domino Lane and Umbria Street
3. Strawberry Mansion Neighborhood
2601 West Glenwood Avenue
4. West Philadelphia
51st Street and Grays Avenue
5. Southwest Philadelphia
3033 South 63rd Street
6. Port Richmond Neighborhood
3901 Delaware Avenue



Recycling in City buildings began in 1991, and was expanded in 1996 following the issuance of Executive Order 5-96, which established a recycling policy for municipal buildings and employees. City agencies receive recycling collection from a combination of the Streets Department, private haulers, and in-house collections (e.g., parks, prisons). The Streets Department collects between 1,000 and 1,200 tons per year from City facilities. In 2014, the City prepared a recycling guide for City agencies, to assist office managers to comply with the City's recycling ordinance. The guide provides an overview of recycling requirements and offers guidance in establishing and managing an effective office program.

A copy of the recycling guide for City agencies is available on the City's website:
<http://www.philadelphiastreet.com/recycling/every-place>.

Table 4-4 identifies recyclable materials that are collected at curbside and that can also be recycled at the City's Sanitation Convenience Centers. Table 4-4 also identifies materials that are not currently recycled through the City's single-stream program. As noted in Section 4.4, the City has entered into a recyclables processing agreement that reserves the right of the City to add or delete recyclable materials upon mutual agreement with the City's recyclables processor.

Table 4-4. Philadelphia Single-Stream Recyclable Materials

Material	Philadelphia Single-Stream Recyclable Materials	Materials Not Included in Single-Stream Program
Aseptic Cartons	Milk Juice Wine Soups	
Metal	Aluminum, Steel and Tin Cans Empty Paint Cans Empty Aerosol Cans Aluminum Baking Dishes Jar Lids and Bottle Caps Clean Aluminum Foil	Pots and pans Batteries Propane tanks Helium tanks
Glass	All Jars and Bottles	Light Bulbs Porcelain and Non-Container Glass
Mixed Paper	Newspapers and Inserts Magazines, Brochures and Catalogs Junk Mail, Envelopes and Writing Paper Scrap Paper Paper Bags Phone Books Paperback Books Greeting Cards and Gift Wrap (non-metallic)	Greasy or Food-Soiled Paper Disposable Paper Plates, Cups, and Takeout Containers Tissues, Paper Towels and Napkins
Plastic Containers	Food and Beverage Containers Detergent and Shampoo Bottles Pump and Spray Bottles	Styrofoam™ (Containers and Shipping/Packing Material) ⁽¹⁾ Plastic Bags Garden Hoses Drinking Straws Solo® Cups
Cardboard	Corrugated Cardboard Shipping Boxes Clean Pizza Boxes Paper Towel Rolls Egg Cartons Dry Food Boxes	Greasy Pizza Boxes
Other		Food Waste Cassette Tapes (VHS and audio) Needles and Syringes Electronics ⁽²⁾

1. Styrofoam™ is a brand name for polystyrene foam.
2. Although not collected curbside as part of the single-stream program, electronics such as TVs and computers are collected and recycled year-round at the City's Sanitation Convenience Centers.

4.5 Recyclable Materials Processing Services

Following an open and competitive procurement process (i.e., Request for Proposals, as more fully described in Chapter 5), the City has entered into a recyclables processing contract with ReCommunity Recycling (see Appendix B for a copy). The contract commenced on October 1, 2014 and, with optional extension periods, these services will expire on September 30, 2018. Services under the contract include the receipt of City recyclables at ReCommunity's Materials Recycling Facility (MRF) near Grays Ferry, followed by appropriate sorting, processing, reuse recycling and/or marketing. The contract includes recyclable materials collected or caused to be collected by the City from residential, institutional, public, and small commercial properties through the City's recycling program (see Table 4-4).

Under the contract, recyclable materials delivered by or on behalf of the City must be processed and sorted. Sorted materials must be delivered to a vendor or market where the sorted materials will be recycled into new products or transferred to a secondary processor for subsequent recycling. The contract requires using the highest and best use markets and end-users for targeted materials collected through the City's program, and prohibits landfilling, burning, or converting for burning any targeted materials without written permission from the City.

The City pays a base, per-ton fee to ReCommunity for receipt and processing of recyclables. In return, ReCommunity contributes \$0.50 per ton to an education fund to be used to supplement recycling outreach efforts. The base fee paid by the City is tied to recovered materials commodity index prices, so increases in commodity values will lower the City's per-ton fee. In addition, the education fund contribution paid by ReCommunity can increase to \$1 per ton if the value of the City's recyclables reaches a certain threshold. This contract marks the first time since 2009 that the City pays for recyclables processing instead of receiving net revenues. As described in Section 4.2, the change is due to a number of reasons, including but not limited to lower market prices for recyclables, ongoing changes to the composition of the recyclables stream (specifically a decrease in the amount of paper and cardboard), higher operating and maintenance costs for increasingly complex MRF operations, and limited market competition for MRF processing. However, even under the current contract structure, the curbside recycling program provides considerable fiscal benefits to the City in the form of savings from avoided disposal costs.

4.6 Commercial Recycling

The City of Philadelphia is home to more than 50,000 businesses. Since 1994, commercial, industrial and institutional buildings within the City have been required to submit a Recycling Plan to the Streets Department and, at a minimum, recycle the same materials as residents (see Table 4-4). Penalties for noncompliance can amount to \$300 per violation per day.

As shown previously in Table 4-1, commercial recycling is well established in Philadelphia with an annual commercial recycling rate that has surpassed 50% for three of the past six years and is currently estimated to be about 48%. However, the City believes that there are opportunities to increase commercial recycling, particularly in condominiums and office buildings where businesses have struggled to comply with recycling requirements. The City

endeavors to build upon success to date by promoting, facilitating and influencing sustained and increased commercial recycling.

The City has created and recently updated a Commercial Recycling Toolkit to assist businesses implement and improve recycling programs. The toolkit outlines how to implement a successful recycling program, provides a checklist for compliance with the City's requirements, provides case studies for a broad cross section of business types, and provides other resources. The goal of the toolkit is to increase the total commercial business recycling diversion rate by providing a roadmap for businesses to implement and improve recycling.

A copy of the Commercial Recycling Toolkit is available on the City's website:
<http://www.philadelphiastreet.com/recycling/work-space-business-commercial/>

4.7 Recycling Support and Education

The City offers or supports various programs to enhance recycling awareness and public education and to facilitate and promote recycling efforts. Key programs are summarized below.

4.7.1 Recycling Rewards Program

Philadelphia residents with curbside recycling service are eligible to participate in the recycling rewards program, a program offered in collaboration with Recyclebank. In 2006, Recyclebank piloted the initial rewards program in Philadelphia. Now, the program is offered in communities across America. In 2010, the program was offered City-wide in Philadelphia. To date, approximately 200,000 households in Philadelphia have signed-up for the program. The program credits participants with money-saving "points" based on the amount of material collected. The points can be redeemed for products or discounts at many area retailers. The City of Philadelphia and Recyclebank were selected for the 2012 Outstanding Award in Public/Private Partnerships by the United States Conference of Mayors (USCM). Figure 4-8 illustrates how curbside set-outs are tracked for participating households. In October 2017, the City began to enroll households in the rewards program automatically using RFID-enabled recycling bins. In November 2017, the Office of Sustainability's Waste Watchers and the Philadelphia Recycling Rewards programs officially became Philacycle. Residents can be rewarded for other Zero Waste actions along with recycling.

Figure 4-9. Philadelphia Recycling Rewards



4.7.2 Philadelphia More Beautiful Committee (PMBC)

The Philadelphia More Beautiful Committee (PMBC) is part of the Streets Department's Sanitation Division. It began in 1965 and has evolved into an urban environmental partnership that is one of the largest volunteer organizations of its kind in the country. Approximately 6,500 Block Captains are involved in neighborhood cleaning activities, working in cooperation with one of eleven PMBC representatives (Clean Block Officers or CBOs) and as many as 90,000 neighborhood volunteers. With two weeks advanced planning any organization such as a school, house of worship, civic association, etc., can arrange with the Streets Department for support for block cleanings. The City will supply equipment and pick-up the rubbish collected. Approximately 6,000 block clean-ups are supported each year, collecting 500 to 1,000 tons of debris annually.

Each year, the Streets Department holds a Block Captain rally, to celebrate and acknowledge their hard work and commitment and to provide workshops and education on current City plans and initiatives for a cleaner Philadelphia. The Department also hosts an annual Clean Block Contest.

4.7.3 Philly Spring Cleanup

Philly Spring Cleanup is an annual City-wide cleanup event that has been in place for ten years. The tenth annual, Philly Spring Cleanup event was held on Saturday, April 14, 2017. More than 20,600 Philadelphians completed 825 cleanups throughout the City. Volunteers collected 649,000 pounds of trash, 2,000 pounds of yard waste and more than 7,300 pounds of recyclable materials in the single-day cleanup program. In the last ten years, Philly Spring Cleanup has attracted more than 100,000 volunteers, removed more than 11 million pounds of trash and collected more than 600,000 pounds of recyclables. The annual cleanup event is coordinated with City volunteers, with the City providing tools and supplies for registered projects. Collected materials are bagged and placed curbside for collection by the City. Host sites are allowed to keep the supplies provided by the City to maintain the areas after the cleanup event.



Figure 4-10. Philly Spring Cleanup

4.7.4 Leaf and Yard Waste Collection

Another important City initiative is leaf and yard waste collection. The City hosts an annual, six-week fall program to collect and compost fallen leaves throughout the

City. The City promotes the program through press releases and media outreach, including local newspaper advertisements, website messaging and social media. Currently, the City provides mechanical leaf collection (City-operated leaf blowers and mechanical sweepers, with vacuum or other mechanical pickup) in designated areas that have a heavy accumulation of leaves. In addition, the City hosts 23 staffed drop-off locations for bagged leaves during this seasonal event. All bagged leaves must be in biodegradable brown paper leaf bags. During the 2015 fall collection program, the City collected approximately 1,750 tons of leaves.

Year-round, yard waste is accepted at all six of the City's Sanitation Convenience Centers. Yard waste is also collected City-wide as a part of the annual Philly Spring Cleanup events. In addition, the City is implementing a spring yard waste collection program, through which residents can drop off yard waste at the 23 established drop-off locations used for the fall leaf collection program.

4.7.5 Holiday Recycling

Similar to the fall leaf collection program, holiday recycling is a seasonal initiative designed to maximize the recycling material yield during the peak holiday season, including the integration of Christmas tree collection. The City promotes the program through press releases and media outreach, including local newspaper advertisements and website messaging. The City uses the leaf drop-off locations during a two-week period in January for the collection of Christmas trees.

4.7.6 Electronic Waste Collection and Recycling

The City began accepting e-waste (including computers and TVs) at HHW events in 2004 and at three Sanitation Convenience Centers in 2008. Currently, the City accepts e-waste at all six of the City's Sanitation Convenience Centers. Since 2011, the quantity of e-waste collected (predominantly computers and TVs) has nearly doubled (see Section 1.6.3). In Spring 2015, the City discontinued supplemental e-waste collection at HHW events. Also, the Sanitation Division no longer collects computers and TVs curbside to comply with the Pennsylvania Covered Device Act. These changes to e-waste collection are not expected to significantly impact the amount of e-waste collected in the City, since about 95% of e-waste was already collected through the Sanitation Convenience Centers.

4.7.7 Event Recycling

An important part of the City's successful recycling program is the promotion of recycling at large public events. An example of this initiative is the continued, highly successful recycling at the Philadelphia Marathon. The three-day race weekend includes nearly 30,000 runners, 60,000 spectators, 3,000 volunteers, 300 exhibitors and approximately 200 staff/crew. During the 2015 Philadelphia Marathon, a new record of 90% diversion was achieved. The Marathon was awarded a "Gold" designation for 2012 by the Council for Responsible Sport, a sustainable sporting event certification body (not unlike LEED sustainability programs), and continues to implement green initiatives to maintain certification.

4.7.8 Green Schools Program

Through the Green Schools Program, schools can receive grants of up to the \$2,500 for green projects, funded through donated Recyclebank points. The schools submit an application for a specific project and grant amount, and if selected, the schools get teachers, parents, friends and the community to donate their Recyclebank points to fund the project. Sixteen (16) Philadelphia schools were selected in 2015-2016 for the Recyclebank Green Schools Program, with over \$30,000 given to the schools. Past projects included recycling and composting programs, school gardens and greenhouses, beautification projects, and other educational programs and events. In the first six years of the program Philly schools have received more than \$158,900 in grants through Recyclebank.

Figure 4-11. Philadelphia Green Schools Program



4.7.9 Public Space Recycling (BigBelly Program)

In 2009, the BigBelly program was rolled-out in Philadelphia, effectively merging recycling and anti-litter initiatives. The BigBelly is a wireless-enabled, solar-powered trash compactor. It is equipped with a photo eye sensor that detects how full the bin is, and compacts the waste as necessary. It is also equipped with a communication system that alerts the City of the bin status. When the bin is less than half full, its status is logged as “green”. At half full, the status changes to “yellow”, and at full it changes to “red”. The City collects the bin only when the status is “yellow” or “red”, avoiding unnecessary collection costs. The communication system also alerts the City to other status conditions, such as if the door is not properly closed, if the battery is at a critically low level, if the sensor is blocked, or if there are other software or communication problems.

The BigBelly units have been deployed throughout the City, replacing wire trash receptacles that were contributing to litter problems. In many cases, BigBelly units have been installed side-by-side with conventional recycling receptacles. From 2009 through 2013, the City installed BigBelly units over a phased implementation period. Additional BigBelly units with recyclers have been purchased and installed through community partnerships with neighborhood associations and community groups. In

total, over 960 BigBelly solar compactor units and 420 recyclers have been deployed within the City limits. Figure 4-11 illustrates the BigBelly units deployed in Philadelphia.

Figure 4-12. BigBelly Program



In November 2017 the City entered into a new long-term media contract that includes advertising rights on 400 BigBelly units located primarily in Center City for a 10-year period and the provision of 275 new units with recyclers and foot pedals. The Streets Sanitation Division is also reconditioning 125 existing units as a part of the advertising program. The process of installing new and reconditioned equipment began in December 2017.

BigBelly and recycler units also serve as billboards to promote recycling, green initiatives and community and social responsibility. Working in partnership with the Philadelphia Mural Arts Program (MAP), students ages 10-14 created seven “Litter Critter” designs that were used to wrap 50 BigBelly units. The City, in collaboration with other organizations such as HACE (the Hispanic Association of Contractors and Enterprisers), have created other artwork for the BigBelly units. The intent of the creative designs is to encourage people to use the sustainable trash and recycling receptacles, reducing litter.

In 2014, the City conducted an analysis of the waste and recyclables collected as part of the BigBelly program. Based on the study, the City collects approximately 2,800 tons per year of waste and 320 tons per year of recyclables through the BigBelly program, representing approximately 10% diversion. Over a one-week period in September 2014, 38 samples of waste and 41 samples of recyclables from the BigBelly and recycler units were collected and sorted, to determine typical composition. The results show a capture rate of approximately 21% to 26% of targeted recyclables. The City can use these findings to assess and improve its public space recycling program.

4.7.10 Targeted Neighborhood Projects

Starting in 2013, the Streets Department and Recyclebank have worked to target neighborhoods with low recycling rates. The purpose of these projects is to concentrate resources and outreach efforts in one particular area during a specific timeframe with the end goal of increasing recycling tonnages, decreasing trash tonnages, as well as increasing Recycling Rewards participation. Outreach tactics comprise of partnerships with local CBOs, canvassing, SWEEP education and ticketing, bin distributions, and school presentations. Target areas have included Hunting Park, West Philadelphia, and Kensington. The success of the first initiative in Hunting Park was recognized with a 2014 Pennsylvania Waste Watchers Award. In 2016, the targeted neighborhood project took a different approach. Six (6) low-performing neighborhoods were selected to receive outreach and enforcement for shorter lengths of time than in previous years. These efforts targeted multi-family properties in hopes of improving recycling rates among this group, and covering a larger area of the city.

4.7.11 Litter Education

In December 2016, the Mayor signed Executive Order 13-16, creating the Zero Waste and Litter Cabinet to move the City toward a Zero Waste and litter-free future by 2035. The Cabinet released an action plan in 2017 to further this goal. This step builds on the Greenworks sustainability vision and represents actionable progress following a long history of anti-litter strategies. Recent historical efforts addressing litter education and control are summarized below.

In 2009, the City embarked on a research effort focused on understanding litter statistics and litter campaign best practices. The research effort resulted in the identification of a solution that would inspire individuals to make a personal commitment to a cleaner, litter free Philadelphia; educate citizens via key ambassadors rooted in the community; and empower citizens through programs such as litter free zones, litter free school zones, business ambassadors, and clean block programs. Litter education is considered a tangential part of the City's recycling program.

In 2010, the City launched the "UnLitter Us" movement to create awareness and understanding of the importance of a litter free city. Subsequently, the City transitioned the campaign to the message, "Pick It Up, Philly". The City uses a comprehensive outreach program for litter education, including traditional mass media (TV, radio, transit messaging), social media messaging (Facebook and Twitter), and community outreach initiatives (educational presentations, rallies, and student training). To date, Litter Free Zones have been established covering more than 400 blocks, 10 schools, and 8 commercial corridors. The Litter Free Zones are intended to empower neighbors to create a clean community, and to motivate school children to take an active role in combating the litter problem at their schools. The City also initiated a Business Ambassador Program to ignite the business community to do its part and spread the litter education message to customers. Currently, there are more than 160 Business Ambassadors in place.

In addition to the Streets Department, Core Network Members for the litter education program include the Office of Sustainability, The Mayor's Office of Public Affairs, Recyclebank, Philadelphia Parks & Recreation, City Year, Greater Committee Philadelphia Cares, City of Philadelphia Mural Arts Program, and the United Way of Greater Philadelphia and Southern New Jersey. Other partners include PhillyRising, SERVE Philadelphia, Keep Philadelphia Beautiful, Commerce Corridors, the Clean Air Council, InSinkErator, and the Carton Council.

4.7.12 Education and Enforcement

Education and enforcement is conducted through the City's SWEEP program (Streets & Walkways Education and Enforcement Program). SWEEP is a City-wide program created to educate citizens about their responsibilities under the Sanitation Code. SWEEP enforces the law against violators through street patrols by uniformed litter enforcement officers, computerized tracking of code violation notices, and adjudication of violations. Under the SWEEP program, specially trained civilian officers meet with the individuals responsible for the operation of businesses and apartment buildings to review cleanup responsibilities. SWEEP officers work with residential communities to address problem locations. In cases of non-compliance, SWEEP officers issue warnings and citations.

The City has about 50 SWEEP officers, with about 70% of their work in the residential area. Officers assigned to Center City focus on commercial enforcement.

4.7.13 Social Media Outreach

Over the past few years, the City has significantly expanded its recycling outreach through the use of social media. The City maintains a comprehensive website, and routinely uses Facebook, Twitter and Instagram to reach out to residents and businesses.

The City's activities relating to sanitation and recycling can be followed on Twitter and Instagram via @PhilaStreets and @CleanPHL; and on the City's websites. Links to these websites are:

<http://www.philadelphiastreet.com/recycling>

<http://www.cleanphl.org>

4.7.14 America Recycles Day

America Recycles Day (or ARD) is a nation-wide event branded and owned by Keep America Beautiful, which features hundreds of locally-themed promotional events around the U.S. The City has held ARD events during the past several years.

4.7.15 Zero Waste and Litter Cabinet

In December 2016, the Mayor signed Executive Order 13-16 creating the Zero Waste and Litter Cabinet to move the City toward a Zero Waste and litter-free future. The

Cabinet released an action plan on August 7, 2017 with recommendations to enhance the cleanliness of streets and public spaces, and guide progress toward a goal of Zero Waste entering landfills or conventional incinerators by 2035. A copy of the action plan is provided in Appendix I. In its first year, the Cabinet implemented several of the recommendations in the action plan through its five subcommittees:

- Waste Reduction and Diversion
- Litter Enforcement and Cleaner Public Spaces
- Data
- Behavioral Science
- Communications and Engagement

These achievements include completing a municipal building waste audit for more than 500 buildings, increasing the number of Zero Waste events held in Philadelphia, working with the District Attorney's Office to better track illegal dumping cases and City departments to reduce litter and increase accessibility to drop-off sites, conducting experiments studying the impact of lidded recycling bins and public waste receptacles on litter and diversion rates, and developing new tools and program for public engagement. Some of these tools are a City-wide Litter Index, the CleanPHL website, and the Philacycle program to reward residents for Zero Waste actions.

Chapter 5 – Selection and Justification of Municipal Waste Management Program

5.0 Introduction

This Chapter summarizes the core elements of the selected waste management program for the City of Philadelphia for the term of this Municipal Waste Management Plan. In support of the selected program, this Chapter presents a waste management hierarchy established by the Streets Department in collaboration with the City's Solid Waste and Recycling Advisory Committee. This Chapter also identifies alternatives that were considered by the City and SWRAC, including alternative solid waste management practices and policy considerations. As described herein, the City will seek to remain current with the changing nature of waste management services, which may include monitoring, studying, and/or piloting certain initiatives over the ten-year term of the Plan, as appropriate.

The selected program presented in this Plan is consistent with the City's sustainability goals provided in its 2009 and 2016 Greenworks plans. Greenworks Philadelphia was launched in 2009 and served as the City's first comprehensive sustainability plan. It represented the City's vision and strategy to create a greener and more sustainable City. As described more fully in the introduction to this Plan, Greenworks Philadelphia addresses sustainability through five areas: energy, environment, equity, economy and engagement. Key goals that are reflected in the selected solid waste management program include diverting more than 70% of solid waste from landfill disposal, and purchasing and generating 20% of the electricity used in Philadelphia from alternative energy sources. Greenworks Philadelphia had a six-year implementation timeline (through 2015) with goals that strive to provide benefits to the City and its citizens beyond 2015. In 2016, the Office of Sustainability released an updated plan titled Greenworks: A vision for a sustainable Philadelphia that continues to guide long-term sustainability work. In 2017, the City formed a Zero Waste and Litter Cabinet and adopted a plan to move the City towards a Zero Waste and litter-free future. The City's Zero Waste and Litter Plan is in its early stages of implementation.

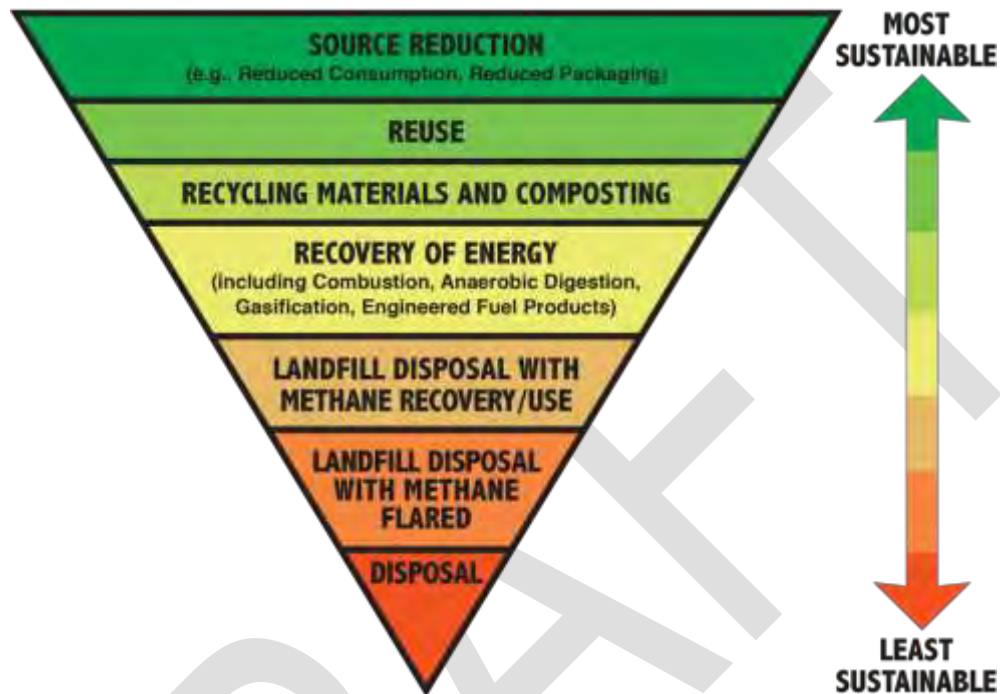
5.1 Waste Management Hierarchy

The Streets Department and SWRAC have established a waste management hierarchy built around a total materials management approach, which supports the dual goals of minimizing waste disposal and maximizing recovery of recyclable materials. The waste management hierarchy is also consistent with the diversion and energy generation goals of Greenworks Philadelphia.

As shown in Figure 5-1, the highest priority and most preferred management option of the City's hierarchy is to minimize the creation of waste (source reduction). Source reduction includes broad actions at the beginning of product lifecycles, such as packaging redesign to reduce waste and consumer education to promote and encourage reduced consumption. Also at the top of the hierarchy is reuse. The next step in the hierarchy is recycling, which returns discarded materials to use in the form of raw materials for the production of new products. Recycling includes composting when the compost product is put to beneficial use. After recycling of materials to the extent feasible is recovery of energy. The last steps in the

waste management hierarchy are disposal, with a priority given to landfill disposal with energy recovery. Disposal is the least preferred management method, because it offers little or no recovery value, but is a necessary part of the hierarchy when considering consumer behavior as well as technical and economic feasibility of recycling options.

Figure 5-1. City of Philadelphia Waste Management Hierarchy



During the preparation of this Plan, the City and SWRAC conducted several visioning meetings to identify and discuss existing and new programs that could potentially be integrated into City practices in alignment with the established waste management hierarchy. This included consideration of collection practices, recycling programs, and processing technologies that could contribute to greater diversion of waste from disposal. The key topics that were explored are summarized in this Chapter, along with a discussion of how they fit within this Plan, as applicable.

5.2 Management of City-Collected Recyclables

In the early 1980's, the City established one of the earlier curbside recycling programs in the United States. Since then, the City has continuously invested in improving recycling throughout Philadelphia, modifying the program as needed based on changes in the waste stream, collection and processing technology developments, and economic parameters such as the availability of markets for recycled materials. In 2006, the City began to transition to single-stream recycling, and by 2009 single-stream recycling was available City-wide on a weekly collection schedule. As described in more detail in Chapter 4, the City's current recycling program is both comprehensive and successful. It provides and facilitates integrated approaches for recycling in residential and commercial establishments, City buildings, schools and public places. The City's single-stream curbside program is supplemented with drop-off convenience centers as well as private recycling services, and

is supported by a strong public outreach campaign and broad educational resources. The City intends to continue the recycling program as outlined in Chapter 4. Some of the key elements of the City's recycling program are briefly summarized below.

5.2.1 City Collection of Recyclables

The City's recycling program includes weekly curbside collection of single-stream recyclables coincident with weekly trash collection. The City provides 22-gallon recycling bins, available at the City's Sanitation Convenience Centers, and at more than two-dozen community partner distribution sites (i.e. City Council district offices, civic associations, etc.). The City also allows residents to use any household container (up to 32 gallons) with "RECYCLING" written on it. There are no limits to the number of recycling bins that can be set out each week. The City collects the materials manually, in rear-loader packer trucks with capacities ranging from ten cubic yards to twenty-five cubic yards. Currently, the City direct-hauls the collected single-stream recyclables to the contracted MRF for processing. In the past, the City has utilized transfer stations to efficiently manage collection operations, and could do so in the future if cost effective or otherwise beneficial to the City.

The materials that are collected for recycling are identified in Chapter 4 of this Plan. Over time, materials have been added to the program, including #3-7 plastics in 2011 and aseptic cartons in 2012. These additions were warranted by the changing nature of the consumer marketplace and the corresponding increase of these materials in the waste stream. The City will continue to monitor the characteristics of waste generation, recycling markets and technology developments and will continue to examine opportunities to add new materials to the recycling program.

In addition to providing residential curbside collection, the City also operates Sanitation Convenience Centers (drop-off centers) for City residents. The Centers accept recyclables as well as rubbish, e-waste, bulk items, yard waste, Christmas trees, automotive tires, mattresses and box springs.

Recycling in City buildings began in 1991, and was expanded in 1996 following the issuance of Executive Order 5-96, which established a recycling policy for municipal buildings and employees. City agencies receive recycling collection from a combination of the Streets Department, private haulers, and in-house collections (e.g., parks, prisons). In 2014, the City updated a recycling guide for City agencies, to assist office managers to comply with the City's recycling ordinance. The guide provides an overview of recycling requirements and offers guidance in establishing and managing an effective office program.

The Streets Department makes recycling collection services available to the School District of Philadelphia (SDP) on a weekly basis, and in the recent past has collected recyclables from a number of schools as part of the City's curbside recycling routes. However, a comprehensive and consistent recycling program has not existed District-wide. Many of the schools require more frequent collection than weekly to manage the volume of recyclables, and have been working to provide increased access to recycling.

Since 2013, the Streets Department has been providing guidance and technical assistance to SDP in order to promote and facilitate a more comprehensive recycling program. In 2014, SDP commissioned a waste composition study, which captured data from three elementary schools, two middle schools and three high schools. The findings demonstrated waste streams with relatively high recyclables content. In the summer of 2014, SDP convened a multi-agency and stakeholder “Sustainability Roundtable.” As an outcome, recycling was identified as one of the top priorities, and a recycling subcommittee was formed. The Recycling Office of the Streets Department sits on that subcommittee, and has also been meeting with SDP staff to assist in developing recycling strategies and options for implementing recycling in the District.

In 2015, SDP in coordination with its hauler (Republic Services) began a recycling pilot program in eight District buildings, including six schools, the bus garage, and the administration building. Results will be evaluated and considered for purposes of potential program expansion to a larger scale. Recyclebank, Keep Philadelphia Beautiful, and the Recycling Office have offered SDP technical assistance with recycling training and outreach. In addition, the Recycling Office secured a \$7,500 technical assistance grant from PADEP that will be used to perform an analysis of SDP’s solid waste contract service levels. The purpose is to identify and implement, as appropriate, adjustments to garbage service levels to allow SDP to more fully implement recycling and save overall cost. SDP has developed a sustainability management plan called “GreenFutures”, which includes efforts to increase recycling across the District.

5.2.2 Selection of Recyclable Processing Facility for City-Collected Recyclables

In July 2014, the City solicited proposals for recyclables processing capacity for City-collected single-stream recyclables. The City received proposals from Waste Management of Pennsylvania, Inc. and Blue Mountain Recycling LLC, d/b/a ReCommunity Recycling. The City reviewed the proposals and met with both companies to allow them to present and discuss their proposals.

Following an open and competitive procurement process, the City entered into a recyclables processing contract with ReCommunity Recycling. The contract commenced on October 1, 2014 and is a standard City agreement with an initial one (1) year term plus up to three (3) successive one (1) year additional terms that may be exercised at the City’s sole option. The contract will expire on September 30, 2018. Services under the contract include the receipt of City recyclables at ReCommunity’s Materials Recycling Facility (MRF) near Grays Ferry, followed by appropriate sorting, processing, reuse, recycling and/or marketing. The contract includes recyclable materials collected or caused to be collected by the City from residential, institutional, public, and small commercial properties through the City’s recycling program, including the following targeted materials:

- Residential mixed paper
- Old corrugated cardboard

- Aluminum beverage cans and containers
- Tin, steel and bi-metal containers
- Plastic food and beverage containers and packaging (#1 - #7)
- Aseptic packaging and gable-top cartons, and
- Glass food and beverage containers

The business and financial terms of the City's current recyclables processing contract reflect industry challenges in the economics of recyclables processing. In general, the cost of processing has increased due to the increased complexity of sorting technology and the changing composition of source-separated recyclables. In addition, recycling markets remain highly variable, in large part due to macro-economic events. As discussed in more detail in Chapter 4, market prices have declined substantially since peaking in 2012 and remain low. Another factor impacting the cost of recycling is the limited amount of recyclables processing infrastructure available in the Philadelphia area, and the large amount of capacity needed to process Philadelphia single-stream recyclables. As a result of these factors, the City's current recyclables processing contract requires the City to pay a per-ton fee for recyclables processing. This differs from past contracts in which the City's recycling program resulted in net revenues for the City. The current contract provides opportunity for the processing fee to be lowered with increased commodity values, and with the potential for the City to achieve net revenue payments if market prices are sufficiently strong. Additional information about the changes in recyclables processing and market prices, and the impact on the City's recyclables processing contract, are included in Chapter 4 of this Plan.

The City will need to secure new recyclables processing capacity effective October 1, 2018. A competitive procurement process will be used to select this future recyclables processing capacity.

In addition to the City's contract with ReCommunity Recycling to process single-stream recyclables, the City has a contract with Newman Paper for shredded paper and OCC.

5.2.3 Recycling Education and Other Programs

The City offers or supports various programs to enhance recycling awareness and public education and to facilitate and promote recycling efforts. The City is committed to maintaining and potentially expanding existing programs based on ongoing consideration of effectiveness and economic viability. Key programs include the following, which are summarized in Chapter 4:

- Recycling Rewards Program
- Philly Spring Cleanup
- Leaf and Yard Waste Collection
- Holiday Recycling
- Electronic Waste Collection and Recycling
- Event Recycling
- Green Schools Program

- Public Space Recycling (BigBelly Program)
- Targeted Neighborhood Projects
- America Recycles Day

Over the past few years, the City has significantly expanded its recycling outreach through the use of social media. The City maintains a comprehensive website, and routinely uses Facebook, Twitter and Instagram to reach out to residents and businesses.

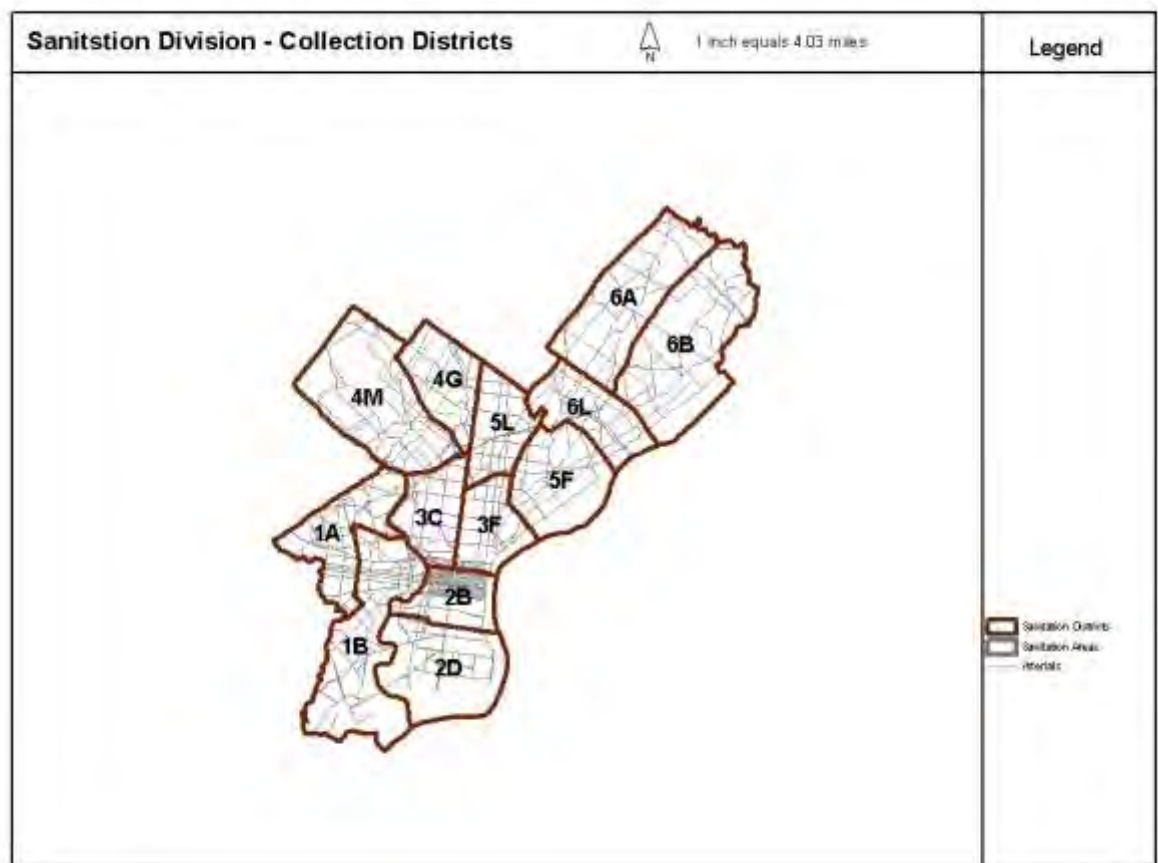
A successful recycling program in the City is the Philadelphia Waste Watchers program, implemented through the City's involvement with the Cities of Service Coalition. Waste Watchers is a volunteer organization that recruits residents to help manage waste at large City events. Volunteers are trained to guide event participants in separating their waste into trash, recycling and compost receptacles. Philadelphia Waste Watchers is a collaborative effort of multiple City entities, including the Office of Civic Engagement and Volunteer Service, the Office of Sustainability, the Office of the City Representative, the Streets Department, Philadelphia Parks and Recreation, and Philadelphia RISE. Through the initiative, more than 1,400 volunteers have been recruited and trained. The initiative has been highly successful. At the 2012 Marathon, Waste Watchers achieved an 87.5% waste diversion rate, earning the Marathon a Gold Certification from the Council for Responsible Sport; in 2015, the Marathon achieved a record 90% diversion. Due to its success, the initiative has been implemented at other major events in the City. In late 2017, Waste Watchers and Philadelphia Recycling Rewards were combined as the Philacycle program to reward residents for Zero Waste actions and train certain individuals to take on leadership roles in Zero Waste outreach.

5.3 Management of City-Collected Waste

5.3.1 Collection

The Sanitation Division of the Streets Department provides collection services at about 540,000 residential locations in the City. Collections are performed using rear loading compactor trucks ranging in size: 25 cubic yard high density, 20 cubic yard high density, 20 cubic yard, and 10 cubic yard. Most trash collection crews collect two routes per day collecting a total of 14 to 20 tons per day. The Sanitation Division administers these services through 6 Sanitation Areas and 13 Sanitation Districts. Figure 5-2 shows the Sanitation Areas and Districts.

Figure 5-2. City of Philadelphia Collection Districts



In addition to curbside residential waste collection, the Sanitation Division has historically provided trash and recycling collections for small commercial establishments and residential buildings with up to 6 units. The City assesses a fee for these collection services.

City Council adopted an Ordinance allowing condominiums to have City trash and recycling collections. A subsequent court ruling resulted in a settlement where these services are provided at the frequency of residential trash and recycling collections, which are provided weekly. In 2005, the Sanitation Division began providing weekly collection services for condominium complexes that meet criteria established by the Streets Department for either curbside services or 2 and 4 cubic yard rear loading dumpster services. Condominium associations are required to complete an application and sign a right of entry agreement in order to qualify for trash and recycling collection services. Currently 28 condominium associations with 1,620 dwelling units are provided this service. The Streets Department adopted regulations concerning these services in 2005.

The Sanitation Division provides a range of special collections for larger City facilities and Philadelphia Housing Authority (PHA) properties. Collection services include

major Police and Fire Department facilities as well as the School District Administration Building, PHA Administration Building Main Library, Boat House Row, City Hall, Criminal Justice Center, and Municipal Services Building. All Police, Fire and Recreation buildings located along residential collection routes are collected weekly along with residential trash and recycling collection.

The Sanitation Division also provides municipal cleaning services including short dump collections, mechanical street cleaning, and litter basket/BigBelly collections. Annually, the City conducts a spring cleanup program. The first Philly Spring Cleanup was in April 2008. In addition to collecting trash and abandoned tires, recyclable materials are separated for recycling and yard waste is separated for composting as well as planting trees. These programs are further described in Chapter 4 of this Plan. Other City Departments such as the Water Department, Prisons, Airport, and Park and Recreation Department also collect municipal solid waste.

5.3.2 Selection of Processing and Disposal Facilities

In 2011, the Streets Department, with the advice of SWRAC, developed and issued a Request for Proposals (RFP) for disposal capacity for City-collected municipal solid waste. The City evaluated responses to that RFP from vendors of transfer stations and disposal capacity in consideration of cost, environmental impact, neighborhood impact, and operational efficiency. Based on the evaluation, the City entered into waste transfer and disposal agreements with Waste Management of Pennsylvania, Inc. and Covanta 4 Recovery, L.P. These agreements commenced on July 1, 2012, and are for a period of four (4) years with, at the City's option, three (3) one (1) year renewal periods. This is the maximum term permitted under the City Charter. The seven-year contract terms, inclusive of all renewal options, will expire on June 30, 2019. The City ordinances authorizing the Streets Commissioner to enter into the agreements with Covanta and Waste Management (Bill Nos. 120393 and 120394, respectively) and the corresponding agreements are described in Chapter 9, Ordinances and Resolutions and provided in Appendix F. The competitive procurement process followed by the City to establish disposal capacity is further described below.

The purpose of the disposal capacity RFP was to select one or more contractors to provide transfer stations, transportation and disposal sites to meet the City's requirements. The RFP required that all transfer facilities be located within the City; have the capability of accepting 300 tons per day of City collected municipal solid waste; and be fully permitted by PADEP. The RFP required that all transfer and disposal facilities be designed, constructed and maintained in complete conformance with all applicable Federal, State and local codes and regulations and good engineering practices, and be capable of accepting municipal solid waste from the City on July 1, 2012. Respondents were required to demonstrate operational experience and financial resources to manage the proposed transfer stations and disposal facilities.

In the RFP, the City reserved the right to award a contract at a maximum daily quantity up to the maximum daily capacity proposed. The City also reserved the right

to annually adjust the maximum daily quantity to reflect changes in the total quantity of municipal solid waste collected by or on behalf of the City. The City committed to minimum annual deliveries calculated, in part, as a percentage of the maximum daily capacity.

The City considered three alternatives in response to the disposal capacity RFP:

- **Alternative 1** applied to a transfer station(s) provided by a contractor for the purpose of receiving municipal solid waste from the City, and transporting the waste to and disposing of it at a disposal facility(ies) provided by the contractor. The contractor was required to have full control of the transfer station(s) and disposal facility(ies) either through ownership or by contract under terms adequate to cover the proposed quantities and the seven-year contract term.
- **Alternative 2** applied to acceptance by a contractor of City collected municipal solid waste delivered from the City's Northwest Transfer Station to a disposal facility(ies) provided by a contractor. The proposed disposal facility(ies) was required be located within fifty (50) air miles of the Northwest Transfer Station, which is located at the intersection of Domino Lane and Umbria Street in the Roxborough section of the City of Philadelphia. The contractor was required to have full control of the disposal facility(ies) either through ownership or by lease of a term adequate to cover the proposed quantities and contract term.
- **Alternative 3** applied to acceptance of municipal solid waste for disposal using alternative waste disposal technology. The City was interested in technology with an energy production efficiency that is superior to mass burn waste to energy technology, and had goals of reducing air emissions and reducing the amount and toxicity of residual waste generated as compared to mass-burn systems (see Section 5.6 for a discussion of alternative solid waste management methods).

The RFP was advertised and publicly posted on eContract Philly on October 18, 2011. The eContract Philly web-based system was created in response to City Council Bill No. 040772-AA adopted on June 9, 2005 to make changes to how the Request for Proposal process works for non-bid contracts to make the process of government fair, open, and responsive to the people it serves. All RFP documents and addendum are posted on the eContract Philly website and proposers are required to submit proposals electronically. Additionally, there are eligibility requirements for vendors based on campaign contribution limits. All applicants and contractors are required to provide information about their contributions to make sure they are below those limits and eligible for non-bid contracts.

In response to the RFP, proposals were submitted by Waste Management of Pennsylvania, Republic Services and Covanta 4 Recovery. Each proposer submitted

multiple alternatives. The City reviewed the proposals and based its selection on criteria that included, but were not limited to the following:

- Superior ability or capacity to meet particular requirements of contract and needs of City Department and those it serves
- Eligibility under Code provisions relating to campaign contributions
- Superior prior experience of applicant and staff
- Superior quality, efficiency and fitness of proposed solution for City Department
- Superior skill and reputation, including timeliness and demonstrable results
- Special benefit to continuing services of incumbent, such as operational difficulties with transition or needs of population being served
- Benefit of promoting long-term competitive development and allocation of experience to new or small businesses, including those owned by minority or disabled persons or by women
- Lower cost
- Administrative and operational efficiency, requiring less City oversight and administration
- Anticipated long-term effectiveness
- Meets prequalification requirements

More specifically, the City evaluated proposals in two phases. The first phase was evaluation of the respondent's qualifications. If the respondent satisfied the minimum qualifications criteria, then the respondent's management and cost proposal was evaluated for compliance with the specifications and proposal requirements and for the proposed cost. The following evaluation criteria were used to evaluate which proposals would best satisfy the City's needs:

- Cost – Evaluation of the cost to the City as an aggregate of several factors: the unit price per ton quoted for performing the work specified in the RFP, how that price would change over time, if at all, and the different travel times for refuse collection or transfer vehicles between point of origin and tipping locations proposed.
- Operational Capability – Evaluation of the respondent's transfer station(s), transportation system and disposal facility(ies) to assess their respective capability to efficiently handle the quantities proposed for the potential term of the contract. Evaluation of operational capability including evaluation of permitted capacity, facility design as it relates to ease of access, reliability of

operation and environmental performance, acceptable turn-around times, flexibility to adapt to potential changes in collection technology and the ability to accommodate night-shift, and Saturday and Sunday deliveries.

- Operating Experience – Evaluation of the respondent's performance history in operating the proposed transfer station(s) and disposal facility(ies) and similar facilities operated by the respondent. This assessment included performance on contract commitments and adherence to environmental regulatory requirements.
- Operations Plan – Evaluation of the respondent's plan for the reliable, safe, and efficient operation of the transfer station(s) and/or disposal facility(ies) and the anticipated distribution of municipal solid waste received among those facilities. Elements evaluated included traffic management procedures; site safety; solid waste transportation equipment and procedures; type and quantity of mobile equipment; facility staffing; operating hours; procedures for the control of dust, noise, odor, availability of back-up equipment, litter and vermin; and procedures for the inspection and removal of hazardous waste.
- Environmental Impacts – Evaluation of respondent's proposed efforts to minimize the environmental impacts of the proposed transfer and disposal system infrastructure on the local community and region in general (including but not limited to the emission/discharge of carbon, methane, volatile organic compounds, metals, particulates, as well as limiting traffic and noise associated with the transfer and disposal system).

Proposals were evaluated comprehensively as a system for alternative management approaches, to determine which single or combination of proposals or other options available to the City, represented the best possible system. After evaluating the proposals the City initiated a negotiation process with all three proposers. After completing this process, the City selected a processing and disposal system utilizing facilities offered by Waste Management of Pennsylvania and Covanta 4 Recovery for a seven (7) year term July 1, 2012 to June 30, 2019. The designated facilities, tonnage allocation, and pricing for the selected disposal system are summarized in Table 5-1.

**Table 5-1. Summary of Selected Transfer and Disposal System
for City-Collected Municipal Solid Waste**

Designated Facility ⁽¹⁾	Maximum Daily Quantity ⁽²⁾	FY 2015/2016 Disposal Rate ⁽³⁾
<u>Waste Management of Pennsylvania, Inc.</u>		
Forge Transfer Station/SpecFUEL™ Facility	1,150 tpd	\$59.27
Philadelphia Transfer Station and Recycling Facility	600 tpd	\$59.27
Fairless Landfill	--	
G.R.O.W.S. North Landfill	--	\$59.27
Wheelabrator Falls Resource Recovery Facility	--	
<u>Covanta 4 Recovery, LP</u>		
58 th Street Transfer Station ⁽⁴⁾	300 tpd	\$63.36
Covanta Delaware Valley	250 tpd ⁽⁵⁾	\$55.66
Covanta Plymouth Renewable Energy	250 tpd ⁽⁵⁾	\$59.76
Rolling Hills Landfill	--	

1. See Chapter 2 of this Plan for additional information on Designated Disposal Facilities, including identification of Alternate Designated Disposal Facilities.
2. Subject to adjustment by the City.
3. Subject to escalation by contractual formula.
4. The Girard Point Transfer Station may be used as a backup transfer station.
5. The City has the right to deliver 250 tpd to either the Covanta Delaware Facility or the Covanta Plymouth Renewable Energy Facility.

The combined approaches summarized in Table 5-1 allow the City to minimize the quantity of waste that is landfilled in accordance with the City's sustainability goals outlined in the 2009 Greenworks plan.

The City's selected disposal system includes the Waste Management SpecFUEL™ facility. The facility currently processes selected or pre-sorted waste using a multi-step process that includes various mechanical and optical sorting equipment. The system is designed to recover recyclable metals, organics, plastic (PVC), and inert materials. The remaining materials (primarily paper and plastic) represent the fuel product.

In 2013, Waste Management received regulatory determination from the USEPA that SpecFUEL™ may be considered a non-waste fuel under the Non-Hazardous Secondary Material rule under certain conditions including fuel product limitations on moisture and ash, chlorine, and sulfur content. Potential markets for the product include coal-fired electric generating facilities and cement kilns. The long-term marketability of the product remains to be demonstrated, particularly in consideration of abundant supply and pricing for natural gas in the northeast.

When fully operational, the SpecFUEL™ facility could process up to 300,000 tons per year of City waste through this processing option. The processing system, previously tested at a pilot facility in San Antonio, Texas, was constructed at the existing Forge Recycling and Transfer Station in Philadelphia. The Philadelphia facility represents the first commercial SpecFUEL™ facility in the United States.

The City will need to secure new transfer and disposal capacity effective July 1, 2019. The RFP and selection process outlined above will be used to select processing and disposal contracts for another seven year term beginning July 1, 2019. In summary, this process will include:

- Develop RFP; advertise and publicly post RFP on eContract Philly
- Receive and evaluate proposals, based on established criteria
- Initiate negotiations with preferred proposers
- Request final price proposals
- Complete evaluation and select new disposal system
- Prepare draft contracts for consideration by City Council
- Present disposal contracts to SWRAC
- Update Solid Waste Plan

5.3.3 Education, Enforcement and Other Programs

Education and enforcement is conducted through the City's SWEEP program, which is a city-wide program created to educate citizens about their responsibilities under the Sanitation Code. Educational efforts are also conducted in partnership with the Sanitation Division's Philadelphia More Beautiful Committee (PMBC) and the anti-litter public service campaign (currently branded as Pick it Up, Philly). Other programs such as the annual Philly Spring Cleanup are also used on a City-wide basis to educate citizens while also achieving other purposes. These programs are described in Chapter 4 of this Plan.

5.4 Management of Privately-Collected Waste and Recycling

Residential units (i.e., certain multi-family dwellings and condominium units) and businesses that do not receive City collection services have waste and recyclable collection services provided by the private sector. Privately collected waste is processed at private transfer facilities or transported directly to a disposal facility. In 2015, private haulers utilized the transfer and disposal facilities identified in Chapter 2 of this Plan.

The City does not control how the private haulers select transfer and disposal systems. As a part of the Act 101 planning process, disposal facilities have been identified that plan to accept privately collected municipal waste generated in Philadelphia. These facilities are listed in Chapters 2 and 6 of this Plan. Private haulers are encouraged to utilize this list of disposal facilities but are not required to use only those facilities listed.

5.5 Organics Management Strategies

During the preparation of this Plan, the City and SWRAC conducted several visioning meetings to identify and discuss existing and new programs that could potentially be integrated into City practices in alignment with the established waste management hierarchy. This included consideration of organics management strategies that could contribute to greater diversion of waste from disposal.

5.5.1 Representative Organics Management Programs

Municipal organic waste management strategies primarily address food waste, yard waste and non-recyclable fiber (e.g., food-soiled paper). As a step towards increased diversion of waste from disposal, many communities are identifying and implementing organics management strategies. Nationally, programs range from voluntary or pilot to those that are established on a city-wide scale. Typical organics management strategies include drop-off programs and curbside collection of source-separated organic material. These strategies are described below, along with selected examples of large city initiatives.

Drop-off programs provide an opportunity for residential organics recycling. Under these programs, residents separate organics such as food waste from other household materials that are being recycled or disposed, and deliver these source-separated organics to a drop-off location. A drop-off program is a lower cost option than curbside collection or mixed waste processing. However, drop-off programs require the most effort on the part of participating residents, and would usually be implemented as a voluntary program. Drop-off programs would typically attract the lowest amount of participation; however, residents that voluntarily participate would likely be diligent in source-separation efforts, providing material with the least amount of contamination.

Curbside collection of source-separated organics is a more expansive organics management strategy. Curbside collection programs increase the opportunity for participation by making the program more convenient to residents and by extending the program to non-residential customers (as applicable). However, curbside programs also have higher cost structures, associated with the cost to collect the source-separated organics and to implement extensive public education and outreach efforts. Curbside collection programs can be implemented as a targeted or pilot program, or on a city-wide basis. Similarly, these programs can be voluntary (e.g., a subscription service) or mandatory. Mandatory programs may require legislative or policy actions to implement and enforce.

Examples of large-city initiatives that illustrate the wide range of organics management strategies in use by municipalities in the U.S. include the following:

- The City of Boston has initiated a volunteer, community drop-off compost program known as “Project Oscar”. This pilot program provides centrally-located neighborhood collection bins where anyone who lives or works in the neighborhood can drop-off food waste to be composted. The bins are

available 24-hours a day in the spring, summer and fall. Originally serving two of Boston's neighborhoods, the ongoing pilot program has been expanded to six communities in the city as well as City Hall Plaza.

- The City of Minneapolis is an example of an initiative to implement an organics drop-off program that is now transitioning to a curbside program. In partnership with the Minneapolis Park and Recreation Board and various neighborhood groups, the City of Minneapolis initially opened numerous residential organic drop-off sites. Following a city-sponsored pilot program, a curbside organics collection program was initiated in August 2015, with plans for phased roll-out on a city-wide basis in 2016. Participation in the curbside program requires sign-up, at no extra cost; presently about 43% of the City's customers have signed up to participate. Organics that are accepted include food scraps, non-recyclable food-soiled paper, and certified compostable plastics. At this time, yard waste cannot be added to the organics recycling bin. Organics must be contained in a paper bag or certified compostable bag prior to set-out in a city-provided collection cart. Collected organics are mixed with yard waste and composted at a commercial composting facility.
- New York City recently began offering curbside collection of organic waste, including food scraps, food-soiled paper and yard waste, to select schools, residences, and institutions. The voluntary program currently serves more than two million residents in all five boroughs, and is expected to grow to more than three million residents by the end of 2017. Materials collected through the city's pilot program are delivered to a city-owned composting facility at the former Fresh Kills Landfill or to compost facilities in upstate New York and Connecticut. The pilot program to divert organic materials from disposal was initiated in response to a local law. The legislation required the City to test a collection system for organic waste and to evaluate the program. Set-out containers, contamination of organic waste (i.e. polystyrene foam) and route optimization are among the factors under evaluation. Use of liners, attraction of vectors such as rodents, collection kits, and integration with yard waste collection are also under evaluation. Legislation has also been adopted by the City requiring certain large-scale commercial food waste generators to separate organic waste and divert the material from landfills for composting or anaerobic digestion. By enacting mandatory source-separation for large generators, the City may encourage the construction of processing capacity by the private sector which may ultimately benefit a residential curbside program, if adopted citywide.
- In the City of Portland, Oregon, all residences with curbside collection are provided weekly recycling and composting (yard debris and food scraps) collection, and every-other-week garbage collection. Each household is given a blue 65 gallon roll cart for recycling and a green 65 gallon roll cart for composting and organics. In addition to yard debris, acceptable organics include food scraps, food soiled paper towels and napkins, tea

bags, coffee filters, pizza delivery boxes and kitchen pail liners including newspaper, paper bags and five approved brands of compostable bags. The roll-out carts are provided and maintained by the franchise hauler, with those costs folded into monthly service rates.

The City of Philadelphia has an established history of organics recycling. For many years, the Streets Department oversaw a program under which area pig farmers collected residential food waste, until low participation and high cost resulted in discontinuation of the program in 1995. At present, the Streets Department offers programs and has undertaken a number of initiatives or pilot projects to increase recovery of organics. Year-round, yard waste is accepted at all of the City's Sanitation Convenience Centers. Yard waste is also collected City-wide as a part of the annual Philly Spring Cleanup events. In addition to yard waste, the Department has an established fall leaf collection program. Yard waste and leaves collected by the City are composted at the Fairmont Park Organics Recycling Center.

Previous efforts conducted by the Department included a pilot project with the InSinkErator company in the West Oak Lane and Point Breeze Neighborhoods for food waste diversion. In 2015, the City amended the building code to require all new residential construction include in-sink food disposers (see Chapter 9).

In addition to these initiatives, the City of Philadelphia Water Department (PWD) has anaerobic digestion facilities at its Northeast and Southwest Water Pollution Control Plants for digestion of sludge. Biogas produced by the Northeast Plant is used to generate electricity, meeting up to 85% of the plant's electrical demand. Biogas produced at the Southwest Plant is used for all campus heating and to reduce the amount of natural gas purchased for thermal drying and pelletizing at the biofuels facility discussed in Chapter 1. The requirement for in-sink food disposers in new residential construction is expected to increase the amount of organic material processed in PWD's digestion facilities. PWD may have digester capacity to also co-digest additional food waste with sludge, but it does not yet have the facilities or a business process in place to receive pre-processed food waste.

Other organic management initiatives within the City include the following institutional and private efforts:

- Philadelphia's prisons have an active composting program. Organic materials from the prisons and from other institutional, commercial and industrial sources are composted using aerated static piles. The prison is prohibited from competing with private industry, so the compost product cannot be sold; however, it is provided to prison staff members with plans to use the product on prison grounds.
- The Dirt Factory is a private composting facility located in Philadelphia. The Dirt Factory is a community composting facility for University City, serving the residential sector. Grass clippings, leaves, and certain food waste materials (e.g. coffee grounds, egg shells) are accepted for drop-off. The materials are composted using Earth Tubs.

- In 2011 the Division of Aviation and six restaurants at Philadelphia International Airport participated in an organic waste pilot program to determine the feasibility of implementing an airport-wide composting program, which was partially funded with a grant from USEPA.
- The New Kensington Community Development Corporation (NKCDC) is a nonprofit organization dedicated to revitalizing the Kensington, Fishtown and Port Richmond neighborhoods in Philadelphia. Its mission is to strengthen the physical, social, and economic fabric of the community by being a catalyst for sustainable development and community building. NKCDC sustainability efforts are neighborhood-based initiatives. Successes are documented through the organization's Green Actions mapping tool, which tracks sustainable efforts of individuals, households and the community. NKCDC efforts have resulted in more than 7,300 pounds of organics being removed from landfills and composted, along with numerous other green actions.

5.5.2 Estimate of Organic Waste Generated in Philadelphia

As further described in Chapter 1 of this Plan, the City performed a residential waste characterization study in 2009-2010 (summary provided in Appendix C). The characterization data show that almost 27% of City-collected municipal waste is organic waste consisting of food scraps, yard/woody waste, and non-recycled compostable paper. The City's 2009-2010 study did not include characterization of commercial waste. However, data from published studies for other jurisdictions indicate that approximately 34% of commercial waste could be organic waste consisting of food scraps, yard/woody waste and non-recycled compostable paper. Based on the quantity of waste disposed by the Philadelphia residential and commercial sectors in 2015, it is estimated that more than 400,000 tpy of organic waste may be generated and disposed in Philadelphia. This data is summarized in Table 5-2.

Considering the estimated quantity of organic waste disposed from the Philadelphia residential and commercial sectors in 2015 (approximately 414,000 tpy), implementation of an organics management strategy for the City could increase the City's recycling rate. Based on recycling data summarized in Chapter 1, the capture rate for curbside recyclables varies widely from about 24% to 89%, with an average capture rate estimated at 50% or higher. Assuming an overall capture rate of approximately 25% for organic waste (i.e., the lower end of the range for the City's curbside recycling program), an organics management system implemented for the City could divert about 100,000 tpy of organic waste from disposal (combined residential and commercial sources).

Table 5-2. Estimate of the Organic Fraction of Municipal Waste (2015)

Parameter	Residential Municipal Waste	Commercial Municipal Waste ⁽¹⁾	Total Waste Disposal
Waste Disposed from Philadelphia (tons)(2015)	459,330	868,974	1,328,304
Estimated Organic Fraction (%) ⁽²⁾⁽³⁾			
Food Scraps	10.8%	22.8%	18.6%
Yard/Woody Waste	11.4%	4.3%	6.8%
Compostable Paper	4.5%	6.4%	5.7%
Total Percent	26.7%	33.5%	31.1%
Estimated Organic Fraction (tons) ⁽²⁾⁽³⁾			
Food Scraps	49,608	198,126	247,734
Yard/Woody Waste	52,364	37,366	89,730
Compostable Paper	20,670	55,614	76,284
Total Tons	122,642	291,106	413,748

1. Excludes C&D waste.
2. Residential waste characterization is based on the City's Residential Waste and Recyclables Characterization Study, 2009-2010 (see Appendix C).
3. Commercial waste characterization is estimated based on the average of data for four published composition studies: Chicago, IL (2010); State of Connecticut (2010); Seattle Public Utilities, WA (2012), and Monterey CA Regional Waste Management District (2012).

5.5.3 Consideration of Organics Recycling in Philadelphia

On June 19, 2014, the Philadelphia City Council adopted Resolution No. 140626 authorizing the Joint Committees of Streets and Services and the Environment to hold hearings on the feasibility and benefits to the City of residential food waste recycling including its impact on environmental quality, hunger prevention, economic savings and job creation (see Appendix F for a copy of the resolution). In November 2014, the Philadelphia City Council held hearings on the subject. Representatives of the Streets Department and SWRAC presented testimony at the hearings. As highlighted in the testimony, the ability of the City to recover additional organics would depend on changes to commercial waste and recycling initiatives as well as increasing options for residential waste diversion. Further consideration of organics waste diversion in Philadelphia would need to include collection, processing, and product marketing elements.

Organics collection services are currently available from several private entities serving Philadelphia, which are listed in the City's Commercial Recycling Toolkit. In February 2015, City Council passed Bill No. 140903, which provides a mechanism and an incentive for restaurants to use a separate dumpster for food waste.

Previously, the City required that all grindable garbage be disposed of using a garbage disposal. The Mayor signed the bill in March 2015 (see Appendix F for a copy). Implementation of a City-wide organics curbside collection program serving the residential sector, could require consideration of approximately 540,000 homes requiring collection services, consisting of single-family and single-family attached households and properties with between two and six dwelling units. The City has estimated that an up-front cost of up to \$30 million may be required to implement collection services for single-family and single-family attached households. The implementation costs would include vehicle purchases, increased staffing levels, and containers.

Organics processing services could include composting or anaerobic digestion. These technologies are briefly summarized below:

- Composting is a process performed in the presence of oxygen that can be controlled through monitoring of feedstock composition and environmental conditions including moisture content, temperature, pH, and oxygen levels. Three main processes are available to support compost processing including use of aerated static piles, windrows, and enclosed systems. Composting produces a biologically stable product that may find application as a soil amendment. As previously described, yard waste and leaves collected by the City are currently composted at the Fairmont Park Organics Recycling Center.
- Anaerobic digestion is performed in the absence of oxygen in enclosed reactors or chambers known as digesters. Similar to composting, anaerobic digestion can be controlled through monitoring of feedstock composition and environmental conditions including moisture content, temperature, and pH. Anaerobic digestion results in the generation of biogas and digestate. Biogas is composed primarily of methane and carbon dioxide. It has a heating value equivalent to about one-half that of natural gas, and can be combusted to generate renewable electricity or upgraded under certain conditions to serve as a replacement for natural gas in pipelines, among other potential uses. The remaining digestate may be composted as described above and may find application as a soil amendment.

Limited organics processing capacity currently exists in the Philadelphia region, including the Fairmount Park Organic Recycling Center (composting of yard waste and leaves) and biosolids digestion at the Philadelphia Water Department. A commercial composting facility was previously operated in Wilmington, DE (Wilmington Organics Recycling Facility). The facility was designed to receive 600 tpd of source-separated materials, to serve the greater Mid-Atlantic region. However, the facility did not reach operations at its design capacity, and was plagued by contaminated feedstock (resulting in contamination in the compost) as well as odor complaints and other non-compliance conditions. As a result, in 2014 the State of Delaware ordered the closure of the facility, which further limited the organics processing capacity available in the region. Further evaluation is needed to

determine the extent to which organics processing capacity exists in the Philadelphia region, including the extent to which existing systems could accept additional organic waste.

Based on the large amount of organic waste that is estimated to be generated in the City and collected for disposal, coupled with uncertainty regarding the availability of processing capacity and cost associated with curbside collection of organic waste and solicitation of proposals, the Streets Department advocated for and received funding from PADEP to perform a feasibility study to determine the efficacy of diversion of organic waste. The scope of work for the Organics Feasibility Study provides for an assessment of the organics marketplace and organics processing options, as well as an analysis of organics collection options available to the City. Estimates of the types and sources of organics generated in the City will be made and expected changes in organics generation over the next 10-20 years will be projected. Organics processors in the region will be identified and surveyed to determine current market rates for organics collection and processing services. The Fairmount Park Organic Recycling Center, co-digestion at the Philadelphia Water Department, and distant processing locations will be assessed. Waste collection practices and equipment will be analyzed to support a preferred organic waste processing system or systems.

The Organics Feasibility Study is being conducted by the Streets Department in collaboration with the SWRAC Organics Subcommittee. Depending on the outcome of the study, the City could issue an RFP for organics processing capacity and/or take other actions to support efforts to divert organic waste from landfill disposal.

5.6 Alternative Solid Waste Management Methods

In addition to organics management strategies, the City and SWRAC considered alternative solid waste management methods that could potentially be integrated into City practices to contribute to greater diversion of waste from disposal. Practices that were considered by the City and SWRAC include mixed waste processing, anaerobic digestion, gasification, alternative collection practices, and other policy considerations. These alternative practices are described below.

5.6.1 Mixed Waste Processing

Mixed waste processing (MWP) can be used to supplement or replace conventional source-separated recycling programs. MWP recovers recyclable material from mixed waste, and prepares the recovered materials for sale to secondary materials markets. A MWP facility is sometimes called a “dirty” MRF, advanced MRF (AMRF) or mixed waste MRF (MWMRF). MWP projects were more common in the 1990s, but the approach has experienced a resurgence during the past few years, in large part because of the advances in waste sorting technologies.

MWP typically consists of a highly integrated system that combines mechanical processing with manual labor. Often there is a manual pre-sort to remove oversized materials, followed by mechanical operations to open bags, reduce material size, and meter materials into the sorting process. The sorting process separates materials by

size, density and type, using manual sorting labor as well as screens, magnets, optical sorting, and other specialized equipment. Following the primary sorting process, MWP may include manual labor and additional mechanical processing to clean and consolidate recovered recyclables to prepare them for sale to markets (e.g., glass clean-up systems, balers, manual quality control). In addition to recovering recyclables, MWP facilities can be designed to separate an organic fraction for subsequent processing or used to produce an engineered fuel.

MWP can recover valuable recyclables that would otherwise be disposed, including fiber, plastic, glass, metal and other materials. However, the recyclable materials that are recovered from MWP are generally of lower quality than recyclable materials collected from source separation programs. Quality issues can impact marketability and value of recyclables, and is believed to be a factor in the sustained drop in market conditions over the past several years. There is a higher risk that materials recovered from MWP would not be used for their highest and best use, but rather for low-end uses due to the presence of contaminants such as glass, food, and liquids. Therefore, MWP may have a more positive impact if used to supplement, not replace, source-separated recycling programs.

Examples of representative MWP plants include the following:

- The GreenWaste Material Recovery Facility located in San Jose, CA is designed to accept up to 2,000 tons per day of residential and commercial trash, yard trimmings, curbside recyclables, food waste, and construction and demolition debris. The facility originally had two side-by-side processing lines that handled municipal solid waste separately from single-stream recyclables, merging clean product from both lines. In July 2015, GreenWaste built a new MRF to process recyclables and modified the existing MRF to process MSW. The existing, modified MRF maintains capability to commingle single-stream with MSW materials to maximize efficiency.
- The City of Montgomery, AL discontinued an existing curbside recycling program in order to send trash (un-separated) to a mixed waste processing facility. The facility was designed to process up to 225,000 tons per year of MSW and achieve up to an 85% recovery rate. Phase Two of the project was planned to involve installation of an anaerobic digestion system to process the organic fraction of the waste. However, in October 2015, citing the inability to sell recovered materials at a price to support the process, a temporary closure of the facility was announced. The city is reportedly exploring options to take over the facility and may switch to single-stream collection.
- The Covanta Advanced Recycling Center in Indianapolis, IN is planned for construction adjacent to the Covanta Indianapolis Energy from Waste facility. The recycling center is being designed to recover recyclables from mixed MSW. The mixed waste processing system may enhance operation of the existing municipal waste combustion system. The facility had an

expected commercial operation date in 2016. However, Indianapolis and Covanta have agreed to suspend their recycling center contract in order to gather more information and allow the city to reassess the project.

- Houston, TX studied and pursued MWP as part of a “One Bin for All” strategy. The project received considerable attention, and even was the recipient of a \$1 million Bloomberg Foundation grant. Houston issued a Request for Proposals and received five proposals in 2014, but as of 2016 no further action has been reported. It should be noted that while Houston was actively promoting MWP, it made considerable investments into its source separated curbside recycling program by expanding carts-based collections city-wide.

The City of Philadelphia could consider MWP as part of the future competitive procurement for waste processing and disposal capacity for a term beginning July 1, 2019. However, the City does not plan to eliminate its single-stream recycling program, and would only consider MWP to supplement single-stream recycling.

5.6.2 Anaerobic Digestion

Anaerobic digestion is a biological process that uses bacteria to decompose biodegradable organic materials (such as food waste, yard waste, and non-recyclable paper) in the absence of oxygen. The process results in biogas consisting primarily of methane and carbon dioxide. The biogas can be used to generate electricity, or it can be upgraded to pipeline-quality gas (biomethane) or other types of fuel (such as compressed natural gas). The remaining material that is not converted to biogas is called digestate. The digestate can be marketed as a fertilizer or soil amendment, typically after composting and curing. If there is not a market for the digestate, it can be gasified to extract the remaining energy value or be landfilled. Anaerobic digestion can result in residue requiring landfill disposal, both from pre-processing of the feedstock and post-processing of the digestate. The viability of an individual anaerobic digestion project will typically depend on the quantity and characteristics of organic feedstock, the ability to enter into a long-term fuel or power purchase agreement under favorable economic terms, the strength and stability of the market for beneficial use of digestate, and the avoided cost of disposal.

There are many variations of anaerobic digestion technology including: wet and dry systems; continuous and batch processing; single stage or multi-stage processing; differing temperature profiles that support different types of bacteria, and various options for mixing (or not mixing) the feedstock before and during the digestion process. In all cases, anaerobic digestion operates within an enclosed tank, vessel or bunker, under controlled conditions and without the addition of air or oxygen. The variations offer differing advantages and disadvantages relating to retention times to complete the process, biogas yields, space requirements, energy needs, and other infrastructure needs. Almost all anaerobic digestion technologies use some type of pre-processing to prepare the feedstock for digestion, including facilities that accept source separated organics for processing. Pre-processing may consist of opening

and removing bags, removing contaminants (e.g., removing silverware and plastic from food waste), size reduction, moisture control, and blending.

Anaerobic digestion facilities are highly suitable for processing source-separated food waste or source-separated food and yard waste. When yard waste is processed, the woody components may be removed and used as a bulking agent in a post-digestion composting process, rather than being used as feedstock to the digester, since these materials are slow to digest and yield low levels of biogas. Management of source separated organic waste requires infrastructure to collect this waste separately from other municipal waste. Anaerobic digestion facilities can also process mixed waste but would usually be paired with a mixed waste processing facility (integrated or as part of a separate operation) to recover recyclables, remove non-biodegradable materials, and digest an organic-rich fraction separated from the mixed waste. Without such pre-processing, the digesters would need to be substantially oversized to handle waste constituents with little or no biogas generation potential, and the resulting digestate would have significantly reduced potential for beneficial use.

Outside of the United States, there are many commercially operational anaerobic digestion facilities processing mixed waste and source separated organics (sometimes in combination with other types of organic feedstock). Many of these facilities have operated for five to 10 years, and some facilities have operating histories that approach 20 years. These facilities are widespread across Europe, including large numbers in Germany, Spain, France, Italy, and Portugal, and they are also located in numerous other countries. While the total installed capacity for anaerobic digestion is quite large in aggregate, most of the individual anaerobic digestion facilities have a relatively small digestion capacity (generally less than 50,000 tons per year, with a small number of facilities with larger digestion capacity). There are a handful of facilities in Europe that process more than 100,000 tons per year of mixed waste. However, for these facilities, the digestion capacity is typically much smaller than the overall facility capacity.

In the United States, anaerobic digestion has been commercially established for many years for feedstock from farms (e.g., manure), biosolids, and process streams from the food and beverage industry (e.g., brewery waste). Recently, there has been progress on development of anaerobic digestion projects in the United States for source-separated organic waste (predominantly food waste and also yard waste from residential and commercial sources), and for the organic fraction separated from mixed waste. While some of the focus has been on site-specific feasibility studies and procurement activities, several projects are at advanced development stages, particularly in California where there are legislated mandates for increased waste diversion. This includes a facility in San Jose that began operations in 2013, designed to process 90,000 tons per year of commercial organic waste and produce electricity (Zero Waste Energy/Kompoferm). It also includes the CR&R/Eisenmann facility in Perris, California, that has completed permitting and construction. This facility will process approximately 80,000 tons per year of source separated yard waste and food waste from residential and commercial sources and will produce compressed natural gas from the biogas. In addition, Harvest Power, in partnership with Entec Biogas, operates a facility in Lake Buena Vista Florida that processes

biosolids; fats, oil and grease (FOG); and food waste from industrial, commercial and institutional sources. That facility began operation in 2014 and is designed to process 120,000 tons per year of organic waste at full capacity.

The City of Philadelphia may include anaerobic digestion as part of the future competitive procurement for waste processing and disposal capacity for a term beginning July 1, 2019.

5.6.3 Gasification

Gasification is a process that converts the carbon-bearing materials in municipal solid waste (such as paper, plastic, wood, rubber, and other organics) into a synthesis gas. The synthesis gas consists primarily of hydrogen and carbon monoxide. The synthesis gas can be combusted to generate electricity, or it can be converted to fuels (e.g. ethanol) or chemicals (e.g. naphtha), which provides flexibility for optimizing project economics.

The remaining inert materials (including glass, sand, and metals) that are not converted to synthesis gas can potentially be recovered for recycling or beneficial use, particularly if the process converts the inert material to a vitrified slag or aggregate material. Gasification can result in residue requiring landfill disposal, both from pre-processing of the feedstock as well as from residual inert material remaining after gasification and not otherwise vitrified (commonly called ash). The viability of an individual gasification project will typically depend on the quantity and characteristics of the feedstock, the ability to enter into a long-term fuel or power purchase agreement under favorable economic terms, the strength and stability of the market for beneficial use of residue, and the avoided cost of disposal.

There are many variations of gasification technology including: pyrolysis (gasification in the absence of oxygen); gasification at differing temperature profiles, and plasma gasification. The variations offer differing advantages and disadvantages relating to synthesis gas yields, space requirements, energy needs, and other infrastructure needs. Many gasification technologies use some type of pre-processing to prepare the feedstock, including size reduction and recovery of recyclable materials. Gasification facilities also offer potential for application of systems to cost-effectively clean the synthesis gas prior to use, are amenable to application of certain highly efficient technologies for air pollution control (e.g. selective catalytic reduction for control of nitrogen oxides), and may incorporate highly efficient power generation technology (e.g. gas turbine/steam turbine combined cycle configurations).

Gasification of mixed waste is established outside of the United States with numerous commercial applications in Europe and Japan. In Canada, the City of Edmonton's waste management program includes the Enerkem Biofuels Facility, which is designed to convert 110,000 tons per year of processed waste into methanol and/or ethanol. In the United States, gasification has been demonstrated or commercially established for certain feedstocks (e.g., lignite, biomass, wood from forestry applications, and biosolids from wastewater treatment).

Gasification of mixed municipal waste is not well established in the United States. However, there has been progress in recent years on development of gasification projects. AlterNRG/Westinghouse operated a 48-ton per day pilot plasma gasification facility near Madison, PA, that gasified a wide range of feedstock including municipal solid waste and refuse-derived fuel. The reactor was constructed in 1984 and was a critical element of commercial project development overseas. Covanta completed demonstration testing of the Covanta Low Emission Energy Recovery Gasification (CLEERGAS) technology, processing municipal solid waste at a resource recovery facility in Tulsa, Oklahoma. IneosBio developed a facility in Vero Beach, Florida, that reportedly processed components of municipal solid waste (vegetative waste and yard waste). The company announced the production of commercial scale ethanol beginning in 2013, but soon after that operational issues and design changes were reported. In late 2016 IneosBio announced that it was putting its ethanol business as well as the Vero Beach facility up for sale. Another gasification facility of interest is a project under development by Fulcrum BIOEnergy near Reno, Nevada. The facility is being designed to process 200,000 tons per year of feedstock prepared from municipal solid waste and produce jet fuel, and has an anticipated startup date in 2019.

The City of Philadelphia may include gasification as part of the future competitive procurement for waste processing and disposal capacity for a term beginning July 1, 2019.

5.7 Alternative Collection Practices

The City and SWRAC considered alternative collection practices that could potentially be integrated into City practices to increase recycling and diversion from landfilling. This included discussion of pay-as-you-throw (PAYT) programs, separate glass collection, and use of larger, wheeled bins for collection of recyclables.

5.7.1 Pay-as-you-throw (PAYT) Programs

PAYT programs charge for waste collection based on the amount of material thrown away. These programs are also known as unit-pricing or variable-rate pricing programs, in which customers are typically charged a fee for each bag or container of waste generated. PAYT programs are usually paired with a recycling program that has no charge to the customer or a reduced charge compared to waste disposal. PAYT programs have been shown to decrease the amount of waste, by providing a direct economic incentive to reduce, reuse and recycle. They are also considered by some to be an equitable approach to waste management, charging customers for what they throw away. For these reasons, the USEPA supports PAYT programs and has developed a tool kit and other informational resources to assist communities implement PAYT. PADEP also provides information regarding implementing PAYT programs. PADEP reports that more than 200 municipalities in Pennsylvania have implemented PAYT and showcases certain boroughs and townships on their website.

PAYT programs have more often been implemented in municipalities that are smaller than Philadelphia. PAYT programs have also been implemented in larger cities, but such programs can have additional challenges. These challenges and concerns include logistical issues, political concerns, the ability of low-income residents to pay for waste collection services, the potential for increased illegal dumping, challenges with multi-family buildings, and enforcement issues. A handful of large cities have implemented PAYT programs. Notable examples include San Jose, CA; San Francisco, CA; Portland, OR; Seattle, WA; Austin, TX, and Worcester, MA.

Implementing a PAYT program in Philadelphia would require significant funding, including for a detailed analysis of program options and ultimately for public education, collection staff training, and enforcement. It would require City-wide collaboration and discussion regarding the advantages and disadvantages of a program and the practicality of implementation in the City. While not proposed to be implemented at this time, a PAYT program could be further considered in the future, consistent with the goal of this plan and the City to increase diversion from disposal.

5.7.2 Separate Glass Recycling

The City's single-stream curbside recycling program includes mixed glass, consisting of household glass containers, bottles and jars (amber, flint and green). Glass currently makes up approximately 24% of the City's single-stream recyclables, as collected.

In an effort to maximize the value of recovered glass, some municipalities (e.g., Santa Fe, NM) have started to collect glass separately from other recyclables. The intent is to allow the glass cullet to remain relatively free of contaminants when compared to the glass product from a single-stream sorting line, in order that it can meet specifications for remanufacture into new glass bottles. Conversely, in recognition of the low price and limited market for glass, some municipalities (e.g., Salt Lake City, UT) provide glass collection on an optional, subscription service basis and others (e.g., Harrisburg, PA) have discontinued glass collection as part of their recycling programs.

The City will continue to monitor the value of glass in the regional marketplace, to determine if future changes to current collection practices are warranted.

5.7.3 Collection Containers

The City provides 22-gallon recycling bins for collection of recyclables, and also allows residents to use any household container (up to 32 gallons) with "RECYCLING" written on it. It is possible that providing larger bins (e.g., 32 gallons) with wheels and lids would increase recycling tonnage, improve the quality of recyclable material collected (i.e., less wet material from covered containers), and reduce litter. However, a large percentage of the City may be unable to accommodate a larger container. As part of Plan implementation,

the City may consider providing larger roll-out recycling bins in neighborhoods where feasible and cost effective.

5.8 Policy Considerations

A key policy objective for this Plan is to incorporate the City's sustainability goals provided in Greenworks Philadelphia (issued in 2009, with annual progress updates through 2015). Greenworks Philadelphia represented the City's vision and strategy to create a greener and more sustainable City. Greenworks Philadelphia considers sustainability through goals that address energy, the environment, equity, the economy and engagement. Integrated into this Plan are policy positions that are consistent with Greenworks Philadelphia, specifically including policies that increase diversion of waste from landfill disposal with engagement by well-informed and empowered citizens.

As part of consideration of alternative solid waste management practices, the Streets Department and SWRAC discussed potential legislative and policy actions as opportunities to facilitate greater diversion of waste from disposal. Discussions included environmentally preferable purchasing, material reduction (e.g., plastic bags), recycling space and capacity requirements for new commercial construction, bottle filling stations, and incentives for recyclables-reliant businesses. The Department and SWRAC have been following potential policy and legislative actions at the State and Federal level, including extended producer responsibility, end-markets development through the Pennsylvania Recycling Markets Center, and container deposit legislation. Considerations that will be addressed during Plan implementation include:

- **City Procurement Process.** Executive Order 13-93, included in Appendix F, establishes as a goal the maximum feasible purchase of recycled content products and reusable or recyclable products, along with other related measures to encourage recycling and reuse through procurement policies. This executive order remains in effect, and under this Plan the City proposes to revisit and reinforce the procurement policies that favor the purchase of recycled and recyclable goods for use by City agencies.
- **Recycling Education.** The City has established and maintains a comprehensive and successful recycling program backed by a strong public outreach campaign. The City has developed many resources, initiatives and incentives to support its recycling program, including a residential recycling rewards program, a commercial recycling toolkit, public space recycling (BigBelly), and a comprehensive anti-litter campaign. In addition, the City has employed integrated media approaches using transit advertising, television commercials, local media print advertising, and direct mail. Under this Plan, the City proposes to sustain its strong commitment to recycling education and outreach. The Streets Department has recently engaged in rebranding the program with the theme "recycle right" to promote smarter and more successful recycling efforts City-wide. Ongoing recycling education programs will seek to engage a broad range of stakeholders through clear, accurate and comprehensive messaging.

- **Public/Private Partnerships.** The City will continue to engage with private entities that generate waste and that provide waste management and recycling services, to ensure City-wide collaboration and progress on achieving increased diversion of waste from landfill disposal. A key accomplishment is the City's commercial recycling toolkit, which was updated and reissued in July 2014. The toolkit outlines the recycling requirements for the commercial sector and provides best practices and case studies for successful recycling programs. The toolkit provides information on assessment tools to facilitate waste management and recycling activities, including information on conducting waste composition surveys and completing waste process mapping. As part of this Plan, the Recycling Office of the Streets Department will explore ways in which it can further assist businesses in utilizing the toolkit, perhaps by assisting with business and institutional waste audits, sharing data and other information and expertise, and/or providing other guidance to help businesses comply with the City's recycling requirements. Also, consistent with the City's policy position on continuing a sustained focus on education and outreach, these education efforts will include messaging to the commercial sector, including companies and manufacturers that are generators and service providers within the City's waste management and recycling program.
- **Educational Institutions.** A component of the City's recycling program is the Green Schools Program, offered in partnership with Recyclebank under the Recycling Rewards Program. As further described in Chapter 4 of this Plan, the program helps fund recycling and composting programs at participating schools. Under this Plan, there is interest in exploring opportunities for further collaboration between the Streets Department and the SDP to increase recycling from school buildings and expand recycling education. Specific programs and initiatives will be developed as appropriate, and subject to the availability of staff resources and budget, and may include efforts such as increasing student involvement in City initiatives and/or developing grade-appropriate waste management and recycling curriculum.
- **Zero Waste Strategy.** As further described in Chapter 13 of this Plan, SWRAC has established a Goals and Metrics Subcommittee that has discussed a number of considerations associated with recycling and waste diversion goals, including aspects of a Zero Waste strategy for the City. Subsequently, in December 2016 the Mayor signed Executive Order 13-16 creating the Zero Waste and Litter Cabinet and a plan was adopted with a goal of Zero Waste by 2035. Through continued deliberations by the Subcommittee and in collaboration with the Streets Department, Zero Waste strategy may include identification of potential programmatic, policy and legislative actions.

5.9 National and State Recycling Resources and Advocacy

On a state and national level, various recycling resources and advocacy groups have been identified that may serve as resources to facilitate the City's efforts to increase recycling and diversion during Plan implementation. A representative list of these resources and groups follows:

- **Professional Recyclers of Pennsylvania (PROP)**. Professional Recyclers of Pennsylvania (PROP) is a non-profit statewide association of recycling professionals from the public, private, and consulting sectors. PROP serves as both a recycling and waste reduction advocacy organization, and provides professional certification and continuing education for members. Many smaller Pennsylvania municipalities require that their recycling coordinators obtain some level of certification through PROP. PROP holds an annual conference each summer. It is also an affiliated state recycling organization with the National Recycling Coalition. (<http://www.proprecycles.org/>)
- **Pennsylvania Recycling Markets Center (PRMC)**. The Pennsylvania Recycling Markets Center is charged with developing and expanding recycling markets in Pennsylvania. The PRMC is headquartered at Penn State Harrisburg with satellite offices near Pittsburgh and is organized as a non-profit, 501c(3) corporation. It receives considerable funding from PADEP. The mission of the PRMC is to expand and develop more secure and robust markets for recovered (recycled) materials by helping to overcome market barriers and inefficiencies. (<http://www.parmc.org/>)
- **Northeast Recycling Council (NERC)**. The Northeast Recycling Council, Inc. (NERC) is a multi-state non-profit organization that advocates for sustainable solid waste management policy and programs. Their primary focus is on source reduction, reuse, recycling, composting, environmentally preferable purchasing (EPP), and decreasing the toxicity of the solid waste stream in the 11-state region comprised of Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Maryland, Pennsylvania, Rhode Island, and Vermont. Maryland became NERC's newest state member in January 2016. NERC manages various technical assistance, demonstration, and outreach projects, and hosts and supports several national programs related to toxics in packaging, electronics recycling coordination, and listservs for EPP and organics. NERC holds an annual conference in the spring of each year. (<https://nerc.org/>)
- **National Recycling Coalition**. The National Recycling Coalition (NRC) is an affiliate based non-profit organization focused on the promotion and enhancement of source reduction, reuse, recycling, and composting in the United States. NRC has 23-affiliated recycling organizations and some 6,000 members. During the past few years the NRC has emerged from financial difficulties, and has become more active in the sustainable materials management policy development arena. The NRC hosted a multi-stakeholder sustainable materials management forum in College Park, Maryland, in the spring of 2015, which sought to begin development

of a strategic National Sustainable Materials Management Action Plan.
(<http://nrcrecycles.org/>)

- **Recycling Partnership.** The Recycling Partnership, previously called Curbside Value Partnership, is a national recycling nonprofit formed in 2003. It is a 501(c)3 organization with the goal to improve recycling in the United States, with a focus on curbside recycling. Much like the Closed Loop Fund, the Partnership is supported by corporate funders, representing recyclables processors, end-users, and consumer brands. The Partnership's approach works with multiple stakeholders, including communities, haulers and processors, and recovered materials end-users. Participating cities and counties are often required to match some level of Recycling Partnership funding, with monies typically being utilized for outreach and education, and purchases of roll-out carts. Since its rebrand, the Partnership has focused efforts on smaller to medium sized cities in the southern U.S., including Florence, AL, Richmond, VA and Columbia, SC.
(<http://recyclingpartnership.org/>)
- **Closed Loop Fund.** Closed Loop Fund (CLF) was formed with invested capital from manufacturers, consumer goods companies, retailers, and recyclers in order to help cities in North America achieve higher recycling rates. The largest retailer and consumer product goods companies are CLF's lead investors: Walmart and the Walmart Foundation, Coca-Cola, PepsiCo and the PepsiCo Foundation, Johnson & Johnson Family of Consumer Companies, Procter & Gamble, Unilever, Keurig Green Mountain and Goldman Sachs. CLF provides municipalities zero interest loans and private firms engaged in public-private partnerships access to capital at below market rates in order to spur investments in municipal recycling programs. The loans may be paid back via landfill diversion savings, commodity revenue, energy revenue (anaerobic digestion) or other form agreed to by the Fund. Cities, counties, and some business enterprises are eligible to apply for funds through the CLF. (<http://www.closedloopfund.com/>)

Chapter 6 – Locations

6.0 Introduction

This Chapter identifies the designated locations for processing and disposal of waste and recyclable material generated within the City of Philadelphia. Designated facilities for City-collected materials are based on agreements that are in place between the City and private parties. The inventory of processing and disposal facilities for privately-collected waste and recyclable materials is based on a survey conducted by the Department during the planning process.

6.1 Locations for Processing and Disposal of City-Collected Waste

As described in Section 2.3, the City entered into waste transfer and disposal agreements with Waste Management of Pennsylvania, Inc. and Covanta 4 Recovery, L.P. These agreements commenced on July 1, 2012, and are for a period of four (4) years with, at the City's option, three (3) one (1) year renewal periods. The seven-year contract terms, inclusive of all renewal options, will expire on June 30, 2019. Table 6-1 presents a list of disposal facilities that are contractually available to the City for disposal through these two agreements. Upon expiration of these agreements, the City will conduct a competitive procurement process to obtain disposal capacity, and will update this Plan as appropriate. Additional information on the facilities listed in Table 6-1 is provided in Section 2.3.

Table 6-1. Contractually Available Facilities for the City of Philadelphia

Permit No.	Facility Name	Designated Facility
Waste Management		
101699	Fairless Landfill	Landfill
101680	G.R.O.W.S. North Landfill	Landfill
400633	Wheelabrator Falls Resource Recovery Facility	Resource Recovery Facility
WMGM037SE001	SpecFUEL™ Facility at Forge Recycling and Resource Recovery Center	Processing Facility
Covanta		
100345	Rolling Hills Landfill	Landfill
400558	Covanta Plymouth Renewable Energy	Resource Recovery Facility
400593	Covanta Delaware Valley	Resource Recovery Facility
100020	IESI PA Bethlehem Landfill	Alternate Landfill
100934	IESI PA Blue Ridge Landfill	Alternate Landfill
400561	York County Resource Recovery Center	Alternate Resource Recovery Facility
400592	LCSWMA Resource Recovery Facility (Lancaster)	Alternate Resource Recovery Facility
100758	LCSWMA Susquehanna Resource Management Complex (Harrisburg)	Alternate Resource Recovery Facility

6.2 Locations for Processing City-Collected Recyclable Material

As described in Section 4.4, the City entered into a contract with ReCommunity for processing services for collected recyclable materials (see Appendix B for a copy). The agreement commenced on October 1, 2014 and, with optional extension periods, will expire on September 30, 2018. Under the agreement, recyclable materials collected or caused to be collected by the City from residential, institutional, public, and small commercial properties through the City's recycling program are delivered to the ReCommunity Facility located at 2904 Ellsworth Street in Philadelphia for processing.

The facilities listed in Table 6-2 serve Philadelphia and the region. Together, they can process over 40,000 tons of recyclables per month.

Table 6-2. Material Recovery Facilities Serving Philadelphia ⁽¹⁾

Company	Facility Name	Location
Republic Services	Republic Services King of Prussia Recycling Center	King of Prussia
J.P. Mascaro & Sons	TotalRecycle	Birdsboro
ReCommunity	ReCommunity Philadelphia	Philadelphia
Waste Management	Philadelphia Materials Recovery Facility	Philadelphia
Gold Medal Environmental	Philadelphia Hauling & Material Recovery & Recycling Facility	Philadelphia

1. There are additional facilities with specialized streams serving the region including: John D'Orazio & Sons, Newman & Co., PaperWorks Industries, and United States Recycling.

6.3 Locations for Processing and Disposal of Privately-Collected Municipal Waste

During preparation of this Plan, the Department conducted a survey and compiled an inventory of disposal facilities interested in being listed in this Plan for processing and disposal of privately-collected municipal waste. Details of the survey, including analysis of capacity available for waste disposal, are provided in Section 2.4 of this Plan.

Table 6-3 provides a listing of facilities that responded to the City's survey and requested inclusion in this Plan. Private haulers collecting waste and recyclables materials from within the City are encouraged to utilize the list of disposal facilities provided in Table 6-3, but are not required to use only those facilities listed. However, private haulers are required to use only permitted disposal facilities in compliance with Title 40 Code of Federal Regulations (CFR) part 258 Subtitle D requirements and the requirements of the Clean Air Act Amendments.

Table 6-3. Inventory of Facilities that Plan to Process and Dispose Privately-Collected Waste and Recyclables Generated in Philadelphia

Facility Name	County	State	Permit Number
Advanced Disposal Chestnut Valley Landfill	Fayette	PA	101419
Advanced Disposal Greentree Landfill	Elk	PA	101397
Advanced Disposal Mostoller Landfill, LLC	Somerset	PA	101571
Alliance Sanitary Landfill	Lackawanna	PA	100933
Blue Ridge Landfill	Franklin	PA	100934
Commonwealth Environmental Systems, L.P.	Schuylkill	PA	101615
Community Refuse Services Inc	Cumberland	PA	100945
Conestoga Landfill	York	PA	101509
Covanta 58th St Transfer Station	Philadelphia	PA	101477
Covanta Delaware Valley Resource Recovery Facility	Delaware	PA	400593
Covanta Plymouth	Montgomery	PA	400558
Delaware Recyclable Products	New Castle	DE	SW-05/01
Fairless Landfill	Bucks	PA	101699
The Forge Transfer Station	Philadelphia	PA	101376
FR&S, Inc dba Pioneer Crossing Landfill	Berks	PA	100346
G.R.O.W.S. Landfill	Bucks	PA	101680
IESI Bethlehem Landfill	Northampton	PA	100020
Keystone Sanitary Landfill, Inc.	Lackawanna	PA	101247
Lancaster Waste-to-Energy Facility	Lancaster	PA	400592
Lycoming County Landfill	Lycoming	PA	100963
McKean County Landfill	McKean	PA	100361
Modern Landfill	York	PA	100113
Mountainview Reclamation Landfill	Franklin	PA	101100
Philadelphia Materials Recovery Facility (MRF)	Philadelphia	PA	Not required
SpecFUEL™ Facility at the Forge Recycling and Resource Recovery Center	Philadelphia	PA	WMGM037SE001
The Philadelphia Transfer Station	Philadelphia	PA	10129U
Seneca Landfill, Inc.	Butler	PA	100403
Susquehanna Resource Management Complex	Dauphin	PA	100758
Tullytown Resource Recovery Facility Landfill ⁽¹⁾	Bucks	PA	101494
Wayne Township Landfill	Clinton	PA	100955
Western Berks Community Landfill	Berks	PA	100739
Wheelabrator Falls Inc.	Bucks	PA	400633
Wheelabrator Gloucester Company, L.P.	Gloucester	NJ	133564
York County Resource Recovery Center	York	PA	400561

1. Permit expired May 2017.

Chapter 7 – Implementing Entity Identification

7.0 Form of Local Government

The City of Philadelphia is a unique municipal government within the Commonwealth of Pennsylvania. In 1854 the boundaries of the City of Philadelphia and the County of Philadelphia were made coterminous and the government consolidated. All remaining separate County functions were assumed by the City in 1952. The City of Philadelphia organizationally contains both typical municipal and county functions.

Under the provisions of Act 101, each county of the Commonwealth is given the power and duty to insure the availability of adequate permitted processing and disposal capacity for the municipal waste which is generated within its boundaries. Each county is also given the power and duty to implement its approved municipal waste management plan. This Chapter identifies the implementing entity for the City of Philadelphia Municipal Waste Management Plan.

7.1 Sanitation Division of the Streets Department

The Philadelphia Streets Department is established by § 3-100 of the Philadelphia Home Rule Charter and has those powers set forth in Title 11 and Title 12 of the Philadelphia Code. The Department is organized into three divisions: Sanitation, Transportation and Administration. Solid waste services in the City of Philadelphia are provided through the Sanitation Division of the Streets Department. The Streets Department has about 1,400 employees and an annual budget on the order of \$90 million.

Implementation of this Plan will be the responsibility of the Streets Department. With the consent of City Council, the Streets Department will arrange for implementation of disposal contracts for City-collected municipal waste and for recyclable materials processing for City-collected recyclable materials.

7.2 SWRAC

As further described in Chapter 9 of this Plan, under Executive Order 15-08 and in accordance with Act 101 the City has established a Solid Waste and Recycling Advisory Committee (SWRAC) that has contributed to the development of this Plan. Chapter 13 of this Plan identifies SWRAC members and highlights SWRAC's involvement in Plan development. SWRAC's role will continue into the future, with duties that include advising the Streets Department regarding implementation of this Plan. The Department will schedule future meetings with SWRAC as needed to review progress of Plan implementation and to discuss other policy, regulations and programs related to this Plan.

Chapter 8 – Public Function

8.0 Public Function

Waste management services in the City of Philadelphia include both public sector and private sector activities. Public sector services include the collection of residential waste and recyclable materials; ownership and operation of six drop-off centers; ownership and operation of a transfer station; ownership and operation of the Fairmount Park Organic Recycling Center, and management of other programs such as public space recycling and a public outreach campaign. Additional information about public sector recycling services is provided in Chapter 4 of this Plan. The City currently does not own or operate any municipal waste processing or disposal facilities, and does not anticipate it will own such facilities during the planning period. Municipal waste processing and disposal is currently a private sector function and is expected to remain so during the planning period.

Chapter 9 – Codes, Ordinances and other Implementation Documents

9.0 Introduction

Mechanisms to implement the Plan include codes, ordinances, resolutions, regulations, agreements and other documents that give the City the authority and the means to carry out and enforce the elements of the Plan. The specific documents relevant to this Plan are summarized below and copies are provided in Appendix F.

9.1 Philadelphia Code Chapter 9-604: Refuse Collection

Chapter 9-604 of the Philadelphia Code provides authority for the Department of Streets to enter into contracts for the collection and disposal of garbage. In addition, it requires any person providing private garbage, waste or recyclable material collection services to be licensed by the City for such services. Entities that hold collection licenses are required to report to the Department regarding the type, amount, source and destination of materials handled. The Code includes monetary penalties and provisions for the City to revoke the license.

9.2 Philadelphia Code Chapter 10-700: Refuse and Littering

The underlying mandate for recycling in the Commonwealth of Pennsylvania derives from the Municipal Waste Planning, Recycling and Waste Reduction Act of 1988 (Act 101). Prior to the enactment of Act 101, the City of Philadelphia adopted its own mandatory recycling ordinance (Bill 1251A) in 1987. This ordinance made source separated residential recycling mandatory for residential properties with six or fewer dwelling units and set a goal to recycle at least 50% of the City's total waste stream. The City's original recycling ordinance was incorporated into the Philadelphia Code under Chapter 10-717.

Chapter 10-700 of the Philadelphia Code provides other provisions, including prohibiting litter and unauthorized dumping of debris, establishing requirements for the use of dumpsters, establishing requirements for commercial sector waste management and recycling activities, identifying eligibility for municipal collection services, and providing the Department with the authority to promulgate certain regulations. The Code gives the Department enforcement measures, including through penalties and fines.

9.3 Philadelphia Department of Streets – Regulations Governing Municipal and Private Collection of Refuse

As authorized under the Philadelphia Code, the Philadelphia Department of Streets has promulgated regulations governing municipal and private collection of refuse, consistent with the requirements of Chapters 9-604 and 10-700 of the Code. Key provisions of the regulations include, but are not limited to:

- Requirements for separation of rubbish, yard waste, recyclable materials and other materials for curbside collection or drop-off;
- Types of containers that may be used for curbside collection, along with weight and quantity limits and other restrictions;

- Collection days, set-out times, and placement requirements;
- Provisions for collection of special materials such as bulk items, Christmas trees, tires, mattresses, household hazardous waste, yard waste and leaves;
- Eligibility requirements for City collection and fees for City services;
- Rights of the Department to initiate pilot programs and to implement new programs, and
- Enforcement provisions.

9.4 Dumpster Ordinance (Bill No. 140903)

City Council passed and the Mayor signed (March 4, 2015) an ordinance (Bill No 140903) amending Chapter 10-722 of the Philadelphia Code, entitled “Dumpster Use”. The ordinance provides for the use of dumpsters for grindable garbage for private collection for composting, anaerobic digestion, or use as farm livestock feed. The ordinance facilitates the use of dumpsters for this purpose by allowing reduced collection frequency if the dumpster is aerated and by allowing certain uses to be licensed as “recycling dumpsters”.

9.5 Recycling Ordinance (Bill No. 150748)

City Council passed a new recycling ordinance in December 2015 (Bill No. 150748). The ordinance amends Chapter 10-700 of the Philadelphia Code, entitled “Refuse and Littering.” The ordinance allows for the Department to issue updated rules and regulations and increase fines for non-compliance (with a particular emphasis on commercial recycling).

9.6 Residential In-Sink Food Disposers (Bill No. 150651)

In August 2015, SWRAC voted to support a bill specifying that in-sink food disposers be required as part of issuance of building permits for new residential construction. City Council adopted this amendment to the building code, and the Mayor signed it into law, in December 2015.

9.7 Executive Order 13-93: Recycled Product Procurement Policy

Executive Order 13-93 establishes as a goal the maximum feasible purchase of recycled content products and reusable or recyclable products.

9.8 Executive Order 5-96: Recycling Policy for Municipal Buildings and Employees

Executive Order 5-96 establishes requirements for recycling in municipal buildings and by City employees, including City agencies such as offices, departments, boards and commissions.

9.9 Executive Order 15-08: Solid Waste and Recycling Advisory Committee

Executive Order 15-08 establishes the Philadelphia Solid Waste & Recycling Advisory Committee (SWRAC), with provisions regarding duties and composition of the SWRAC. Additional information about SWRAC, including its role in development of this Plan and its intended future role in Plan implementation, is provided in Chapter 13. Executive Order 15-08 also affirmed the City's goal to achieve a combined residential and commercial recycling rate of 50%.

9.10 Waste Transfer and Disposal Agreements and Authorizing Ordinances

As further described in Chapter 2 of this Plan, the City entered into waste transfer and disposal agreements with Waste Management of Pennsylvania, Inc. and Covanta 4 Recovery, L.P. for disposal capacity for City-collected municipal waste. These agreements commenced on July 1, 2012, and are for a period of four (4) years with, at the City's option, three (3) one (1) year renewal periods. The seven-year contract terms, inclusive of all renewal options, will expire on June 30, 2019. City ordinances authorizing the Streets Commissioner to enter into the agreements with Covanta and Waste Management are provided in Bill numbers 120393 and 120394, respectively.

9.11 Recyclables Processing Agreement

As further described in Chapter 4 of this Plan, the City entered into a recyclables processing agreement with Re-Community to process City-collected recyclable material. This agreement commenced on October 1, 2014, and, with optional extension periods, will expire on September 30, 2018.

9.12 Resolution No. 140626 (Food Waste Recycling)

On June 19, 2014, the Philadelphia City Council adopted Resolution No. 140626 authorizing the Joint Committees of Streets and Services and the Environment to hold hearings on the feasibility and benefits to the City of residential food waste recycling including its impact on environmental quality, hunger prevention, economic savings and job creation. Further information is provided in Chapter 5 of this Plan.

9.13 Executive Order 13-16: Zero Waste and Litter Cabinet

On December 20, 2016, Mayor James F. Kenney signed Executive Order 13-16 establishing the Zero Waste and Litter Cabinet. This Cabinet is an interdepartmental effort to increase Philadelphia's waste diversion rate toward a long-term goal of Zero Waste entering landfills or conventional incinerators, while combating litter and enhancing the cleanliness of streets and public spaces.

Chapter 10 – Orderly Extension

10.0 Orderly Extension

This Waste Management Plan has been prepared by the Streets Department in collaboration with the City-established SWRAC. The Plan is consistent with existing codes, ordinances and programs as described herein. As required by Act 101, the Plan provides for the orderly extension of municipal waste management systems in a manner that is consistent with the needs of the area and is also consistent with existing plans affecting the development, use and protection of air, water, land and other natural resources. This Plan takes into consideration planning, zoning, population estimates, engineering and economics relating to waste management services.

The Streets Department's Sanitation Division will continue to be the implementing agency for the Plan.

In an effort to ensure that the Plan can be used as a tool for developing innovative waste management solutions, the Streets Department's Sanitation Division will continue to work with the Solid Waste and Recycling Advisory Committee and its Subcommittees on Organics, and Goals and Metrics. This structure will be used to formulate long-term strategies concerning organics management using the Organics Feasibility Study as an element of implementing Zero Waste strategies.

Working under the directives of the City's Zero Waste and anti-litter initiatives, the Streets Department's Sanitation Division will continue to develop a comprehensive litter management strategy that involves the SWRAC, KPB, Community Organizations, and Block Captains forming partnerships to address litter issues Citywide. The Sanitation Division will also evaluate operational tools across City departments and agencies that can be integrated into a comprehensive litter management strategy.

This process will be integrated with the Zero Waste vision stated in the Office of Sustainability's Greenworks: A vision for a sustainable Philadelphia (November 2016) and the action plan for waste reduction and litter prevention adopted by the Zero Waste and Litter Cabinet, created by Executive Order 13-16 in December 2016. Implementation of the Plan will evaluate new data as it is made available in progress reports. As needed, the Plan will be revised to reflect new strategies, goals and regulations adopted by the City.

Chapter 11 – Methods of Disposal other than by Contract

11.0 Methods of Disposal other than by Contract

This Plan requires all City-collected waste and recyclable material to be processed or disposed at designated facilities through contracts entered into between the City and other parties. Designated facilities are identified in Chapters 2 and 6 of this Plan. Existing contracts are included in Appendix F. Upon expiration of these contracts, the City intends to enter into new contracts for continued processing and disposal services subject to the City's competitive procurement practices. This Plan will be revised to describe any new contracts and to update the list of designated facilities, as appropriate.

Municipal waste generated within the boundaries of the City but not collected or controlled by the City shall be addressed by the generator. As described in Chapter 9 of this Plan, the Philadelphia Code and corresponding regulations specify requirements for municipal and private collection of waste and recyclable materials. Private haulers collecting waste and recyclables materials from within the City are encouraged to utilize the list of disposal facilities provided in Chapters 2 and 6 of this Plan, but are not required to use only those facilities listed. However, private haulers are required to use only permitted disposal facilities in compliance with Title 40 Code of Federal Regulations (CFR) part 258 Subtitle D requirements and the requirements of the Clean Air Act Amendments.

Chapter 12 – Non-Interference

12.0 Non-Interference

Consistent with the requirements of Act 101, this Plan has been developed with the intent that it will not interfere with the design, construction, operation, financing or contractual obligations of any existing municipal waste processing or disposal facility.

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Chapter 13 – Public Participation

13.0 Introduction

In July 2013, the Department requested the Mayor's office appoint a new SWRAC as part of the Plan revision process. Following the request for a newly-appointed SWRAC, the Department began a substantial review of the previous plan using a fair, open and competitive process that followed Act 101 and PADEP requirements. This process has involved SWRAC and other opportunities for public participation. Public participation will continue to be a part of Plan implementation.

13.1 SWRAC

In 1988, the City established a solid waste advisory committee in accordance with Act 101 requirements. In 2008, the Mayor issued Executive Order 15-08, which consolidated the City's existing solid waste advisory committee and the City's existing recycling advisory committee into one committee (now called the SWRAC). Over time, a number of new members have been appointed to SWRAC, including in 2013 with the re-establishment of SWRAC to support the City's plan revision process. Table 13-1 identifies SWRAC members and their respective affiliations.

SWRAC is currently co-chaired by two SWRAC members. The co-chairs lead the SWRAC meetings, which are also regularly attended by Department staff, City consultants, and other interested parties. SWRAC has established two subcommittees that assist with focused aspects of solid waste planning: an Organics Subcommittee and a Goals and Metrics Subcommittee.

The mission statement of the SWRAC Organics Subcommittee is as follows:

"The mission of the SWRAC Organics Subcommittee is to assist with the development of a robust and sustainable infrastructure (including but not limited to systems, policies, procedures, process and assets) for organics recycling within Philadelphia. The Subcommittee will draw upon our combined knowledge and expertise to identify and consider current research, trends and technologies in order to support efforts that result in the best and highest use of organics waste for the City."

The SWRAC Goals and Metrics Subcommittee was formed to provide programmatic and policy thoughts and recommendations regarding goals and objectives of the Plan, including discussion of specific metrics and goals for the Plan.

**Table 13-1. City of Philadelphia Solid Waste and Recycling
Advisory Committee (SWRAC)**

NAME	ORGANIZATION	TENURE
Michelle Feldman, Executive Director (SWRAC Co-Chair)	Keep Philadelphia Beautiful	2013 – Present
Fern Gookin, Vice President (SWRAC Co-Chair)	Revolution Recovery	2013 – Present
Bob Anderson, Vice President of Business Development	Curb My Clutter	2013 – Present
Phil Bresee, Director of Recycling	City of Philadelphia Streets Department, Recycling Office	2013 – 2016
Jeff Cardwell, Vice President for Facilities and Operations	Philadelphia School District	2013 – 2015
Andrew Dalzell	South of South Neighborhood Association	2013 – 2014
John R. Embick, Attorney at Law	Environmental Law	2013 – Present
Katherine Gajewski, Director	Philadelphia Office of Sustainability	2013 – 2015
Dan Garofalo, Environmental Sustainability Director	University of Pennsylvania	2013 – Present
Sofia Guernica, Program Coordinator	Philadelphia Office of Sustainability	2017 – Present
Salvatore Iadonisi	US Recycling (Newman Paper)	2013 – Present
Paul M. Kohl, PE, Planning & Research Manager	City of Philadelphia Water Department	2013 – Present
Marisa Lau, Acting Recycling Coordinator	City of Philadelphia Streets Department, Recycling Office	2017 – Present
Francine Locke, Director of Environmental Services	Philadelphia School District	2013 – Present
Scott McGrath, Director of Environmental Services	City of Philadelphia Streets Department, Sanitation Division	2016
Denis Murphy, Director of Commercial Corridor Development	City of Philadelphia Commerce Department	2016 – Present
Joseph Otis Minott, Esq., Executive Director	Clean Air Council	2013 – Present
Chuck Raudenbush, Government Affairs Mgr.	Waste Management, Inc.	2013 – Present
Mike Roles, Program Coordinator	Clean Water Action	2014 – 2015
Maurice Sampson, Eastern Pennsylvania Director	Clean Water Action	2013 – Present
Andrew Sharp, Deputy Director for Policy	Philadelphia Office of Sustainability	2013 – 2016
Vivian Van Story, Founder & President	Community Land Trust Corp	2013 – Present
Debbie Zimmer	Dow Chemical Corp.	2013 – 2016

During preparation of this Plan, the Department met with SWRAC on a routine basis (approximately monthly) to discuss solid waste and recycling topics and Plan development. Table 13-2 identifies the key topics of the SWRAC meetings that were held beginning in November 2013 and continuing during Plan preparation. In addition to the key topics listed, SWRAC meetings routinely included status updates on Plan preparation, legislative updates, identification and discussion of topics of interest and issues as raised by SWRAC members and City staff, and various announcements of events and activities related to solid waste management and planning activities. SWRAC and the Department held two visioning meetings (June 2014 and July 2015), consisting of facilitated group discussion for key aspects of Plan development – strategic opportunities and planning objectives, and selection and justification of the solid waste management program (Chapter 5 of the Plan). Appendix G includes copies of the minutes of the SWRAC meetings. Agendas, minutes, and other information related to SWRAC are also available for review and download on the Streets Department’s website (<http://www.philadelphiastreet.com/recycling/solid-waste-recycling-advisory-committee-swrac/meetings/>). SWRAC will continue to engage with the Department to provide review and input during Plan implementation.

Table 13-2. Overview of SWRAC Meetings

Meeting	Key Topics
November 2013	<ul style="list-style-type: none"> • Discussion of SWRAC administration • Overview of solid waste planning, including Act 101 and PADEP requirements and the administrative history of Philadelphia planning
February 2014	<ul style="list-style-type: none"> • Presentations on recycling and anti-litter outreach campaigns • Presentation on the Business Recycling Toolkit
March 2014	<ul style="list-style-type: none"> • Presentation on recycling at the Philadelphia marathon • Presentation on the Philly Spring Cleanup program • Discussion of SWRAC subcommittees
April 2014	<ul style="list-style-type: none"> • Presentation of solid waste and recycling data and metrics • Presentation on public space (BigBelly) waste and recycling program
May 2014	<ul style="list-style-type: none"> • Introduction to Greenworks Philadelphia • Presentation on solid waste management statistical compilation and reporting methodology • Presentation update on public space (BigBelly) waste and recycling program
June 2014	<ul style="list-style-type: none"> • SWRAC visioning meeting – facilitated group discussion to identify strategic opportunities and planning objectives
August 2014	<ul style="list-style-type: none"> • Follow-up to SWRAC visioning meeting – small group discussions on key topics identified in previous visioning meetings, including break-out sessions on: <ul style="list-style-type: none"> ○ Recycling programs and initiatives ○ Public participation ○ MSW management program and technologies ○ Implementing entity
September 2014	<ul style="list-style-type: none"> • Continued SWRAC group discussion of June and August visioning sessions (solid waste trends and issues) • Discussion of SWRAC short-term and long-term next steps

Meeting	Key Topics
October 2014	<ul style="list-style-type: none"> • Discussion of City Council initiatives regarding plastic bag legislation and a food waste/organics hearing • Discussion of the leaf collection program • Update on residential recycling initiatives and programs, including the “Recycle Right” campaign and the new recyclable material processing contract
December 2014	<ul style="list-style-type: none"> • Review of City Council hearing on organics recycling • Discussion of commercial recycling regulations
February 2015	<ul style="list-style-type: none"> • Update on organics recycling activities, including a proposed organics recycling feasibility study and a City Council bill regarding dumpster licensing changes (re: organic waste) • Discussion on the status of recyclables end markets • Presentation on the Pennsylvania Recycling Markets Center (PARMC), including e-scrap industry challenges and the Covered Device Recovery Act • Discussion on the formation of a SWRAC organics recycling subcommittee
March 2015	<ul style="list-style-type: none"> • Presentation on end-markets for organics recycling
April 2015	<ul style="list-style-type: none"> • Presentation on the Philadelphia School District GreenFutures Sustainability Plan • Discussion of FY 2015 curbside recycling trends
May 2015	<ul style="list-style-type: none"> • Discussion of City Council bills pertaining to refuse/littering and single-use bags • Presentation on alternative technologies for solid waste disposal
July 2015	<ul style="list-style-type: none"> • SWRAC visioning meeting – facilitated group discussion regarding Chapter 5 of the Plan (Selection and Justification of Municipal Solid Waste Management Program) • Discussion of the development of a public participation strategy as part of the planning process
August 2015	<ul style="list-style-type: none"> • Follow-up to the July 2015 visioning meeting, including a review of SWRAC input and related discussion of potential strategic goals
October 2015	<ul style="list-style-type: none"> • Presentation on macro-level recycling market trends • Presentation/update on Philadelphia curbside recycling tonnages and MRF pricing
November 2015	<ul style="list-style-type: none"> • SWRAC special meeting to discuss a City Council bill proposing to revise the Philadelphia recycling ordinance • SWRAC follow-up meeting with continued discussion/reconsideration of the proposed bill, followed by a SWRAC vote to support the bill • Establishment of a SWRAC Goals and Metrics Subcommittee
January 2016	<ul style="list-style-type: none"> • Presentation on the City’s residential, multi-family recycling project
February 2016	<ul style="list-style-type: none"> • Reports from SWRAC Subcommittees • Remarks from the Office of Sustainability regarding pending updates to the Greenworks plan
April 2016	<ul style="list-style-type: none"> • Discussions regarding future focus on the City’s recycling ordinance (commercial licensing and reporting) and residential regulations • Program updates, including Philly Spring Cleanup results, multi-family projects, the school district GreenFutures program, and the Prison System’s composting program

Meeting	Key Topics
May 2016	<ul style="list-style-type: none"> Remarks on the GreenFutures Sustainability Plan release and recycling expansion in schools SWRAC review of the Plan before release for public comment
June 2016	<ul style="list-style-type: none"> Discussion of SWRAC comments received on the Plan
August 2016	<ul style="list-style-type: none"> Presentation on Recycled Artist in Residency, a non-profit arts organization Update on release of Plan for a 90-day public comment period
September 2016	<ul style="list-style-type: none"> Public meeting with comments received on the Plan Upcoming release of the 2016 Greenworks Sustainability Plan announced
October 2016	<ul style="list-style-type: none"> Reports from SWRAC Subcommittees Program updates, including outdoor recycling added at Parks and Rec facilities, leaf recycling, and school recycling outreach and education
December 2016	<ul style="list-style-type: none"> Report from SWRAC Goals and Metrics Subcommittee Discussion of next steps for Plan revisions after the public comment period
January 2017	<ul style="list-style-type: none"> Presentation on the City's Zero Waste and litter initiative Report from SWRAC Organics Subcommittee
February 2017	<ul style="list-style-type: none"> Update on response document for comments received on the Plan Update on Zero Waste and litter initiatives Review of preliminary 2015 commercial recycling tonnages
March 2017	<ul style="list-style-type: none"> Presentation on the Zero Waste Partnership Program under development by the Streets Department to incentivize waste reduction Working group discussions on the Zero Waste Partnership Program and a Zero Waste definition and diversion framework
April 2017	<ul style="list-style-type: none"> Various program updates, including Philly Spring Cleanup Report from the SWRAC Organics Subcommittee Continued discussion on the Zero Waste Partnership Program
May 2017	<ul style="list-style-type: none"> Report from SWRAC Organics Subcommittee Continued discussions on Zero Waste initiatives, including defining and tracking Zero Waste in Philadelphia
June 2017	<ul style="list-style-type: none"> Update on recycling outreach activities Group activity to develop recommendations for the Zero Waste Partnership Program
July 2017	<ul style="list-style-type: none"> Report from the SWRAC Organics Subcommittee on Philadelphia Water's RFI for pre-processed food waste Presentation and training by the Mayor's Office of Policy, Legislation, and Intergovernmental Affairs on the City government and effective advocacy
September 2017	<ul style="list-style-type: none"> Report from the SWRAC Organics Subcommittee on responses to Philadelphia Water's RFI Presentation by the Streets Department on the Zero Waste Partnership Program Recyclebank introduced Philacycle, a new program to reward residents for Zero Waste activities

Meeting	Key Topics
November 2017	<ul style="list-style-type: none"> • Update on Philacycle launch and program activities • Update on the new state budget and implications for recycling • Updates on the Greenworks magazine and Zero Waste and Litter Cabinet

13.2 Procurement Process for Disposal and Processing Capacity

Due to City Charter restrictions, disposal contracts for City-collected waste are limited to a base term of four (4) years with up to three (3) one-year renewals (total contract term of seven (7) years). Therefore, this Plan does not include contracts that provide for disposal capacity for the full ten (10) years of the planning period; contracts are in place for disposal of City-collected waste through June 30, 2019. As a result, during the term of the Plan the Department will conduct one or more open, fair and competitive procurements to enter into new contracts for processing and disposal of City-collected waste and recyclable materials, upon the expiration of the current agreements. All procurement documents and public meetings of the Department and City Council related to such procurements will be published as required. Updates to this Plan will be issued to integrate new processing and disposal contracts and their associated designated facilities, as applicable.

13.3 Open Public Comment Period

The City released the draft Plan for public review and comment on September 5, 2016. In addition to members of the SWRAC, the public was provided access to the Plan at five (5) libraries and via the City's website. Notice of availability of the draft Plan was published on two occasions in September 2016. The City allowed ninety (90) days from the second publication date of September 15, 2016 for receipt of public comments, and held a public meeting on September 22, 2016. Based on public comment and in collaboration with SWRAC, the Department revised the Plan and prepared a response document provided in Appendix H.

