IV. WASTE MANAGEMENT

The Fairfax County Solid Waste Management Program (SWMP) oversees solid waste recycling, collection, transfer and disposal within the county. The program’s vision statement is as follows:

**Board of Supervisors Environmental Vision:**

“Fairfax County will use integrated waste management principles to ensure future system capacity and sustainability. The objectives are an increase in the recovery of recyclable materials; a decrease in the amount of material disposed of; a decrease in greenhouse gas emissions by managing landfill gas; development of renewable energy and alternative fuels for buildings and vehicles; and preservation of open space, green space, and wildlife preserves.”

**Overview of the Solid Waste Management Program**

Key aspects of the SWMP are described below.

**General**

The SWMP operates two solid waste management facilities, including the I-95 Sanitary Landfill Complex (I-95) and the I-66 Transfer Station Complex (I-66). In addition, a waste-to-energy facility owned by Covanta Fairfax, Inc. (CFI) is located at the I-95 complex. The Covanta facility is referred to as the Energy Resource Recovery Facility (E/RRF). The E/RFF is located at the I-95 site. The I-95 Landfill no longer accepts domestic solid waste. It now serves only as a monofill for ash originating from the E/RRF and a handful of other regional facilities that generate similar types of ash. In addition, the county maintains the closed I-66 sanitary landfill at the I-66 complex. These two county owned landfills require constant upkeep in order to ensure that the facilities are environmentally sound. The county operates a transfer station at I-66. Refuse deposited by collection vehicles is loaded into tractor-trailer trucks and transported to the I-95 E/RFF or other appropriate locations for disposal. Recycling centers are located at the I-95 and the I-66 facilities. County staff also provides various collection services to designated residential districts around the county (approximately 44,000 homes) and most county government offices.

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Covanta Fairfax, Inc.

The county contracts with Covanta Fairfax, Inc. (CFI) to accept the county’s municipal solid waste (MSW) at the E/RRF, which is owned by the firm. The E/RRF burns MSW to power steam turbines that generate electricity. The facility began commercial operation in June 1990 on a 23 acre site in Lorton, Va. Covanta indicates that it generates approximately 80 MW of electricity, enough to meet the needs of approximately 80,000 homes.

I-95 Landfill Operations

The I-95 Landfill in Lorton was opened by the District of Columbia in 1972. The county assumed operational responsibility for the facility in 1982. The facility accepted Municipal Solid Waste (MSW) for landfill disposal through 1995. Since that time, only incinerator ash has been disposed in the landfill. The SWMP is responsible for the operations and maintenance of the facility, including the final cover on the closed landfill sections, the landfill leachate control system\(^2\) and the landfill gas\(^3\) control system. The site also features the following:

- A Recycling and Disposal Center (RDC) for residents and businesses wishing to self-haul their MSW, traditional “blue-bin” recyclables, yard waste and brush. The site also accepts construction and demolition debris (CDD) and a wide range of specialty wastes which are consolidated for transportation and recycling or proper disposal elsewhere, (e.g., tires, E-waste, hazardous waste, old propane tanks, scrap metal).

- Collection of brush, which is ground into mulch. The mulch is available free to residents and businesses on-site, and is also available to the public at a network of designated pick-up locations throughout the county which are serviced by the SWMP.

- A recently-installed glass processing plant, which can process glass bottles and jars into a range of construction materials for civil engineering uses, aesthetic applications and/or manufacturing feedstock.

- A landfill gas-to-energy facility owned and operated by Aria. This facility purchases the landfill gas (LFG) being produced by the closed landfill and uses it to power a battery of engine-generator sets that sells approximately six MW of electricity to Dominion Energy. This facility also cleans and compresses approximately 19,000 MMBTU’s of LFG per year and delivers it by dedicated pipeline to the county’s Noman Cole wastewater treatment plant for use as an alternative fuel.

- An award-winning system that heats the maintenance facility and truck wash, using LFG as an alternative fuel.

\(^2\) Leachate is the liquid that drains or 'leaches' from a landfill. It contains both dissolved and suspended material and is difficult to treat.

\(^3\) Landfill gas is a complex mix of different gases created by the action of microorganisms within a landfill. Landfill gas is approximately forty to sixty percent methane, with the remainder being mostly carbon dioxide with small amounts of other volatile organic compounds. It is odorous unless properly handled.
• A small recreational facility constructed for the use of remote-controlled model aircraft.

I-66 Transfer Station Operations

The I-66 Landfill was closed in 1982. As part of its integrated waste management system, SWMP constructed and now operates a 2,000-tons/day MSW transfer station at the site. The SWMP is responsible for the operations and maintenance of the facility, including the final cover on the closed landfill, the landfill leachate control system, and the LFG control system. The largest aspect of the facility’s operation is the transfer operation, which includes a fleet of approximately 50 tractor-trailers. The site also features a range of activities similar to I-95, including:

• A collection facility for residents and businesses wishing to self-haul their MSW, recyclables, yard waste and brush. The site also accepts the same range of specialty wastes as I-95 (e.g., CDD, tires, E-waste, hazardous waste, old propane tanks, scrap metal, etc.). As local market conditions demand, the facility can also accept recyclables for consolidation and long-distance transport.

• The production and distribution of recycled mulch.

• A small glass processing plant.

• A landfill gas-to-energy facility. This facility cleans and compresses LFG being produced by the closed landfill and delivers it to several adjacent public sector facilities for use as an alternative fuel for space heating systems.

County Collection from Sanitary Districts and Government Operations Collection Areas

The SWMP provides county-staffed and operated curbside collection services for refuse, recyclables (including yard waste) and bulky items. The SWMP also provides vacuum leaf collection to a selected number of residential customers. In total, the SWMP services approximately 44,000 homes--this constitutes about 10 percent of the households in the county. These services are paid for through general fund transfers (for the government operations) and special tax assessments on the residential customers. The rate for residential collection services is set by the Board of Supervisors. Creation of a small or local Solid Waste Collection Area (sanitary district) is possible only when a petition is made by a resident and supported by at least 55 percent of the residents within an area of 50 homes or more.

Solid Waste Recycling Program

Virginia Department of Environmental Quality (DEQ) regulations require Fairfax County to recycle a minimum of 25 percent (by weight) of its MSW. Although approximately 90 percent of the waste and recyclables generated in the county are collected and/or managed by the private sector (with only 10 percent of MSC collected in the county’s Sanitary Districts), it is the SWMP that is responsible for meeting the 25 percent recycling requirement. There are two Recycling
and Disposal Centers in the county, located at 4618 West Ox Road, Fairfax and 9850 Furnace Road, Lorton. Each year, the SWMP collects recycling data from licensed waste collectors and recycling businesses operating in the county, to support the required annual report that is sent to DEQ in Richmond.

Education and Outreach Programs

Public education and outreach are key components of any successful municipal recycling program. To that end, the SWMP has focused on developing outreach and education programs that take advantage of its partnerships with county agencies, Fairfax County Public Schools, community organizations, commercial businesses and private sector waste collection companies. In general, outreach programs consist of: visits to commercial establishments in targeted business sectors and apartment buildings; providing support, publicity, educational exhibitions and displays at county festivals; events specifically dedicated to recycling and sustainability themes; public speaking at community and industry events; and providing technical support and advice to county decision-makers on emerging solid waste management technologies and issues.

Enforcement Program

The SWMP Code Enforcement Unit regulates the private and public sector waste collection industry within the county. The unit also responds to resident and business complaints, conducts random compliance inspections and initiates legal enforcement actions when necessary. This unit also provides education, outreach and compliance assistance to the regulated business community.

Future Programs

The SWMP has a number of initiatives in startup and planned for the future. These include:

- Establishing organic waste collection and recycling through modest demonstrations of established and emerging technologies, with the intent of promoting greater diversion of organic wastes in county homes and businesses, thereby encouraging the private sector to meet the growing demand for this type of service.

- Increasing the current levels of post-consumer glass recycling by demonstrating established and emerging technologies for recovering glass and reusing or recycling it in alternative ways to the traditional processing and resale to the commodities market. Similar to its goals for increased organic waste recycling, the SWMP intends to promote a wider array of recycling options for glass, thereby encouraging the private sector to meet the challenge of recycling glass in the face of diminishing demand from the traditional markets.
• Reconfiguring the I-95 complex to allow for its use as a transfer station in an emergency, and the construction of a Materials Recovery Facility (MRF)\(^4\) to promote or explore more diverse and efficient approaches to the collection and resale of collected recyclables.

• Reconfiguring operations at the I-66 complex to improve customer experience, enhance the safety of facility operations and improve the facility’s environmental performance.

• Exploring the use of alternative fuels in SWMP operations, primarily through the use of compressed natural gas (CNG) and hybrid vehicles and equipment. The SWMP has hybrid vehicles already in its fleet and has collaborated with the county’s Department of Vehicle Services in recent years to research and monitor developments in the field of CNG and hybrid refuse collection vehicles.

**Other Programs**

Programs outside the SWMP that have a positive impact on solid waste management within the county include the county’s Department of Code Compliance (which provides enforcement for visual and other complaints) and two private environmental groups: the Alice Ferguson Foundation and Clean Fairfax.

**SWMP Status**

**Integrated Waste Management**

Integrated solid waste management is a systematic approach to solid waste management that is the standard for progressive communities throughout the world; it lies at the heart of the SWMP’s approach to serving its role with Fairfax County. Consequently, the SWMP’s system considers how to reduce, reuse, recycle and manage the county’s solid waste in an efficient manner that is mindful of human health and the natural environment.

**Components of the Fairfax County/SWMP System**

The four components or functional elements of the county’s system include source reduction, recycling and composting, waste transportation and waste disposal. These waste management activities are undertaken both in concert, and also as a series of hierarchical practices. A brief discussion of each of these functional components is given below.

**Source Reduction**, also known as waste prevention, aims at reducing waste generation. SWMP source reduction strategies include a variety of approaches, such as:

• Encouraging government operations and the general public to purchase and use products that are designed for recycling, durable, sustainable goods, and, where possible, in concentrated forms.

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\(^4\) A materials recovery facility (MRF) is a specialized plant that receives, separates and prepares recyclable materials for sale to end-user manufacturers.
• Promoting the practice of purchasing and using reusable products, including reusable packaging.
• Supporting government and private sector refurbishing of goods, to prolong product life.
• Guiding government and the general public to purchase goods that utilize less or no packaging.
• Providing education on how to minimize food spoilage and waste.
• Discouraging the use of goods that don’t last long and can’t be reused or recycled.

The county’s waste source reduction efforts lessen the environmental impacts associated with waste handling, transportation and disposal.

**Recycling and Composting** are important aspects of the solid waste management program. Both recycling and composting provide economic benefits such as job creation, in addition to reducing the community’s cost for waste disposal. These two practices also generate cost-effective sources of material for further use, enhance our environment and significantly contribute to the reduction of greenhouse gas emissions (GHGs).

**Waste Transportation** is an activity that must be integrated systematically with the other waste management system components to ensure smooth and efficient operations. For the county, transportation activities include the collection of waste from curbside and businesses, as well as from the I-66 Transfer Station, where waste is reloaded onto tractor-trailers for delivery to I-95 or other selected disposal sites as needed.

**Waste Disposal**, generally through the use of waste-to-energy or landfilling (in that preferred order) is how the SWMP manages that fraction of our MSW that cannot be recycled. The SWMP insists and ensures that the disposal facilities used by the county are properly-managed and have a good compliance history.

Integrated waste management is used to work towards future system capacity and sustainability. This includes public education for source reduction and reuse, recycling, disposal at the Covanta Energy/Resource Recovery Facility and enforcement.

**Recycling Rate**

As it has for many years now, Fairfax County’s recycling rate exceeds the Virginia minimum requirement of 25 percent. The program recorded recycling rates between 47 percent and 51 percent between 2012 and 2016. There was a jump from 42 percent to 47 percent between 2011 and 2012 due to the conversion to single stream recycling. Note that this jump is somewhat suspect because the statistics are based on the weight of material picked up and not on what is actually recycled. An unknown quantity of this material is rejected from recycling due to contamination and other factors. Cartons were added to the list of materials that are accepted for recycling. With single-stream, all paper fibers, plastics, metals and other containers are mixed in a collection truck. Materials are then separated for reuse at a MRF. The single-stream option replaces the dual-stream option, which is where people separate certain recyclable materials and place them in separate containers for collection.

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5 With single-stream, all paper fibers, plastics, metals and other containers are mixed in a collection truck. Materials are then separated for reuse at a MRF. The single-stream option replaces the dual-stream option, which is where people separate certain recyclable materials and place them in separate containers for collection.
recycling. The county’s vendor (American Recycling Center) is now able to process cartons at its MRF.

Industry Outreach and Education

Outreach and education staff conducted in-person visits to office buildings and construction sites to assess the level of compliance with recycling ordinances and to make direct contact with property managers and construction managers. The goal was to help them recycle properly. Staff is currently visiting hotels and restaurants. The SWMP also responds to many ad-hoc requests for assistance from civic groups (e.g., HOAs), the business sector and local institutions (e.g., schools, colleges, parks and libraries).

Sanitary District Re-routing

This initiative involved the reorganization and changing of collection route boundaries within the sanitary district so as to maximize the productivity of collection equipment and personnel. In addition, the initiative involved balancing the number of homes collected for each collection vehicle, rationalizing traffic patterns for those vehicles and applying automation where feasible. The SWMP staff reports that this has resulted in a reduction in the number of collection trucks and personnel needed to complete daily tasks. The project is ongoing, with efforts to-date resulting in a re-route of the county collection fleet that has reduced operations by several truck shifts. The personnel required to collect county customers has decreased by 10 percent, and improvements in the operational safety record are to be recognized with a national award from the Solid Waste Association of North America. In effect, automating and improving the efficiency of the SWMP system has taken many people out of harm’s way.

Reduced Collection Frequency Pilot

In response to an increased demand for less-frequent collection where food waste is largely absent (e.g., office buildings, retail and industrial facilities), a procedure was developed outlining a process for considering such requests on a pilot-program basis.

The reasons that Chapter 109.1 of the Fairfax County Code requires a minimum of once-weekly collection of refuse/recycling include the negative environmental, public health, pest control and nuisance impacts associated with the putrescible components of refuse, which is largely food waste-related. However, non-residential establishments wishing to be allowed collection on a less-than-weekly basis must complete an application form and undergo a site inspection by SWMP personnel. Following a positive review by the SWMP inspector, the program provides a written authorization to commence less-frequent collection for a defined period of time not to exceed one year. Renewals take the form of a new application, site inspection and written authorization.
I-95 Landfill Enhancements

Honey Bee Initiative

Honey bee populations in Virginia have declined by two-thirds since 1970 due to Colony Collapse Disorder, invasive mites and pesticides. Bees pollinate one-third of the food we eat, so their health is tied to ours. The SWMP has partnered with George Mason University's Honey Bee Initiative to create pollinator habitat at the I-95 Landfill and has built several apiaries (a cluster of bee hives) on site. The Honey Bee Initiative Pollinator Program will receive $50,000 over the next five years ($10,000 per year) from the county's Environmental Improvement Program (EIP). This bee project aligns well with the Board of Supervisors' 20-year Environmental Vision and creates educational opportunities for students and community groups. This project is also one of the ways in which the landfill is transforming into a destination for environmental experimentation and education.

Air Park

The Northern Virginia Radio Control Club (NVRC) has been operating a remote control airfield at the I-95 Landfill Complex since May 2017. The landfill provides a perfect setting for this use, with large open areas devoid of trees. As part of a Memorandum of Understanding (MOU) with the club, NVRC pursued and received a special exception permit for the construction and operation the air park for flying radio and remote controlled aircraft. More information on the airpark can be found at NVRC.com.

LFG Collection System Upgrades and Leachate Control System Upgrades

The landfill gas recovery and reuse system has been operating at the I-95 Landfill Complex since 1990. It is one of the largest landfill gas well fields and landfill/electrical generation networks in the state. Methane gas from decomposing organic matter buried in the I-95 Landfill is captured and used to make electricity and to assist in the incineration of bio solid residuals at the Noman M. Cole, Jr. Pollution Control Plant. The gas is currently saving the county approximately $105,000 annually. The use of the landfill gas at Noman Cole is environmentally preferable over using purchased natural gas. The gas quality and quantity is deteriorating slowly as the amount of decomposing material declines.

The landfill gas wellfield and supporting infrastructure needed to be upgraded due as a result of the aging infrastructure. With the upgrade, landfill gas is now recovered from 222 extraction wells that produce landfill gas as part of the new system. These facilities are operated by county staff.

The I-95 Landfill leachate system also needed to be upgraded. The upgrade project was implemented in compliance with a consent decree issued by the State Water Control Board, initiating the overhaul to the leachate collection system at the I-95 Landfill. Improving the functioning of the leachate control system ensures that leachate is discharged to the sanitary sewer system and greatly reduces the chances of a spill of leachate from the collection system,
and potential subsequent environmental impacts. The overall project was completed on time and within its budget. The total project cost was $3,500,000.

Smaller scale landfill gas and leachate upgrades were completed at the I-66 Landfill in FY 2015.

**Fairfax County Department of Code Compliance**

The Department of Code Compliance (DCC) receives and investigates code complaints covering a wide range of issues, including zoning complaints, signs, noise, lighting and illegal dumping. Based on the total number of signs in rights-of-way collected over the past two years, it appears that the posting of illegal signs has declined; however, this issue still presents a challenge to the county, as frequent violators have not been deterred by the fines assessed and continue to place signs in the rights-of-way. Where appropriate, DCC issues citations for dumping on public and private property and for leaking trucks. Citation statistics are included in the Data Appendix of this report.

**Alice Ferguson Foundation**

The Alice Ferguson Foundation’s (AFF) mission is to connect people to the natural world, sustainable agricultural practices and cultural heritage in their local watersheds through education, stewardship and advocacy. AFF has multiple programs, including the Potomac River Watershed Cleanup, Trash Free Schools, The Litter Prevention Campaign Trash and more. Details are located at: [www.potomaccleanup.org](http://www.potomaccleanup.org).

**Clean Fairfax**

Clean Fairfax is a private, nonprofit corporation which operates in close cooperation with the SWMP and several other agencies within the county government. Clean Fairfax focuses on environmental education and produces the county’s official Earth Day and Arbor Day event, called SpringFest Fairfax.

**Current Status of Key Issues**

**Fire Recovery Efforts at CFI**

On February 2, 2017, there was a fire at the E/RRF that rendered the plant inoperative. As of October 2017, the Covanta plant is still off-line. Currently, waste is being diverted from Fairfax County to other landfills in the state. If Covanta is able to come back on line by the end of the year as planned, about 900,000 tons will have been diverted to landfills. While the facility is off-line, Covanta is performing previously scheduled maintenance and upgrades to the boilers and emissions control system of the facility. Covanta is evaluating upgrades to the fire detection-suppression systems, such as infrared detection that works in concert with foam suppression.
What the SWMP is Doing to Increase Recycling

The SWMP continues to expand outreach targeting the county’s business sector, apartment buildings and public institutions. Most recently, a waste reduction and recycling “tool kit” was developed for hotels and restaurants, to promote recycling and more sustainable operations. A similar resource is being developed for apartment complex managers. Last year, staff visited over 700 office buildings and 500 construction sites. This year, visits to more than 400 hotels were recently completed.

To promote alternate markets and increase local uses for post-consumer glass, glass crushing and screening machines were installed at the I-66 Transfer Station and at the I-95 Landfill Complex. The products produced by these units will be used in various engineering projects throughout the county, and can also serve in a number of aesthetic applications and potentially a feedstock for specialty glass product manufacturing. Photographs of the two units are shown below.

Figure IV-1: I-66 Glass Crushing and Screening
What Happens to Materials Delivered for Recycling?

Industry literature suggests that 90-95 percent of material sent to area MRFs is actually recycled. Data specific to Fairfax County are not currently available because some of these data are considered proprietary by most of the regional MRFs, and the MRFs merely recover the material for re-sale to a commodities broker or interim processor. As a result, the final destination and disposition of the sold materials is not tracked. Data that are gathered is not specific to Fairfax County.

Recycling Markets

Paper and metals have a robust market and are almost entirely captured and recycled. The markets for PET⁶ and HDPE⁷ plastics are robust, while the markets for the other resin types such as PVC, polystyrene and others are highly variable or non-existent. Glass recycling in the region is limited to use as alternate daily cover and specific civil engineering applications at sanitary landfills (e.g., Prince William County uses glass for these purposes). However, this demand only occurs when the accepting landfill is engaged in projects that can use the material (i.e., the market is not reliable or sustainable in the long-term). Household Hazardous Wastes, E-waste, used oil, batteries, compact fluorescent lights, yard waste and tires are collected at the county recycling centers as described below.

Update on Food Waste

The SWMP is promoting a pilot food waste composter program, to promote firms in the region that offer source-separated food waste collection and composting. The first firm to register under the pilot program was contracted to provide food waste composting at the county’s annual

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⁶Polyethylene terephthalate commonly used in water bottles
⁷High density polyethylene commonly used in opaque bottles for milk and bleach
Earth Day celebration – SpringFest – and at the annual Public Works Week picnic. Following the success of these events, further collaborative efforts are anticipated in the future.

**Update on Household Hazardous Waste (HHW)**

The HHW Program accepts hazardous materials free of charge from residents and disposes or recycles these materials according to local, state and federal regulations. Permanent drop-off centers for HHW are located at the I-66 Transfer Station and the I-95 Landfill Complex. Recycling is also available at the above locations for electronics, ink and toner cartridges, rechargeable batteries, mercury thermostats, motor oil, antifreeze and fluorescent bulbs. A pilot program for recycling used cooking oil was started in 2014. The county has also entered into a partnership with Habitat for Humanity to reduce and reuse the amount of waste latex paint being generated by homeowners. Further, the county provides a for-fee hazardous waste disposal program (Conditionally Exempt Small Quantity Generator – CESQG) to selected small businesses and institutions.

**Gaps**

Gaps are discussed in each category of the Board of Supervisors’ Environmental Vision statement for Waste Management and in additional areas as follows:

**Fairfax County will use integrated waste management principles to ensure future system capacity and sustainability**

This practice is being followed, however the Covanta facility remains central to the county’s waste management capacity. In 2017, the Covanta fire had a significant impact on the
surrounding community. It also reduced energy recovery from the county’s waste and resulted in landfill space being consumed. This event also indicates that consideration of alternate environmentally-positive means of addressing solid waste should continue to be pursued. In particular, a higher recycling rate and beneficial use of the material is needed to ensure future capacity and sustainability.

**Increase waste recycling; decrease waste disposal**

While there is good progress in instituting programs to increase recycling, the actual recycling rate remains at about 50 percent, where it has been for many years. Due to limitations on the ability to collect data, the actual recycling rate may be significantly lower. Another aspect of recycling is the ultimate fate of recycled materials. The county has no specific information on how much of the recyclable material picked up at the curb is actually recycled and what ultimate beneficial use is made of the material. This is a significant gap in our knowledge of the effectiveness of the county’s recycling program.

**Decrease greenhouse gas emissions by managing landfill gas**

This is being addressed.

**Development of renewable energy and alternative fuels for buildings and vehicles; and preservation of open space, green space and wildlife preserves**

The honey bee program serves the goal of wildlife preserves. Alternative fuels for buildings and vehicles is not being addressed under the SWMP, however, there is a program developing under the direction of the county executive.

**Illegal dumping**

The county is to be congratulated for successfully addressing the illegal dumping recommendations from the 2016 ARE report.

**Recommendations**

1. Improve recycling. This recommendation has been in place for multiple years. The county has instituted programs to increase recycling. We encourage this effort and recommend the county initiate a formal study to obtain practical recommendations on how to increase the recycling rate. This study should include specific goals for the different categories of recyclable material, numerical recycling targets and a schedule.

2. Collect and report data on the various types of materials collected, how they’re recycled and the environmental benefit of each material. Develop a practical means of estimating the actual recycling rate and the ultimate beneficial use of each category of recycled material. This may require future requests for proposals (RFPs) and contracts with materials recovery facilities (MRFs) and others to provide the information needed, or a sampling/survey program may be used.
3. Investigate how to encourage county contractors, as well as other trash disposal and recyclables processing facilities, to manage materials according to their best environmental use. This may require changes to future contracts.

4. EQAC continues to recommend a statewide container redemption fee to reduce litter and increase the recovery of containers in a form that can be recycled.