Solid Waste Management Plan
2020 Update

Unified Government of Wyandotte County/Kansas City, Kansas

Burns & McDonnell Project No. 122351

March 2022

Solid Waste Management Plan
2020 Update

prepared for

Unified Government of Wyandotte County/Kansas City, Kansas

Burns & McDonnell Project No. 122351

March 2022

prepared by

Burns & McDonnell
Kansas City, Missouri

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Page No.

LIST OF TABLES

Page No.

LIST OF FIGURES

Page No.

LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
BOC	Unified Government Board of Commissioners
BEA	U.S. Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
Burns & McDonnell	Burns & McDonnell Engineering Company, Inc.
CAA	Clean Air Act
C&D	Construction and Demolition
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
EREF	Environmental Research & Education Foundation
HHW	Household Hazardous Waste
JCDHE	Johnson County Department of Health and Environment
K.A.R.	Kansas Administrative Regulations
K.S.A.	Kansas Statutes Annotated
KDHE	Kansas Department of Health and Environment
MARC	Mid-America Regional Council
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
NAICS	North American Industry Classification System
OSWER	Office of Solid Waste Emergency Response
PAYT	Pay as You Throw
PCC	Post Closure Care
RCRA	Resource Conservation & Recovery Act

Abbreviation	Term/Phrase/Name
SARA	Superfund Amendments and Reauthorization Act of 1986
SMM	Sustainable Materials Management
SWDA	Solid Waste Disposal Act
SWMC	Wyandotte County Solid Waste Management Committee
SWMP or Plan	Solid Waste Management Plan
The County	Wyandotte County, Kansas
U.S. EPA	United States Environmental Protection Agency
Unified Government	Unified Government of Wyandotte County/Kansas City, Kansas
Waste Management	Waste Management, Inc.

EXECUTIVE SUMMARY

Purpose and Plan Development

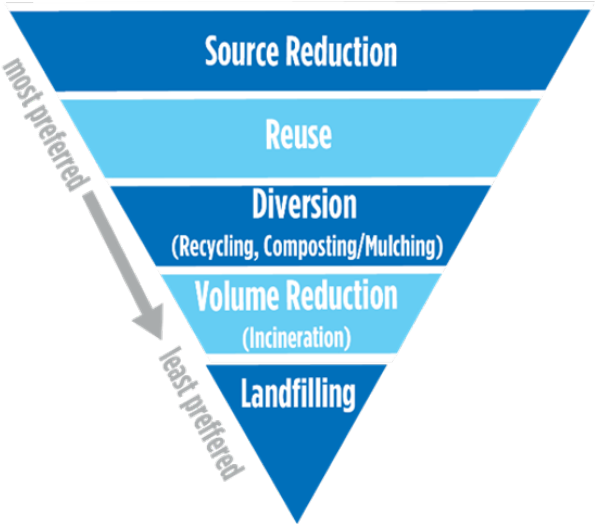
The updating of Wyandotte County's Solid Waste Management Plan (SWMP) is required by the Kansas Department of Health and Environment (KDHE) every five years, as described in the Kansas Statutes Annotated (K.S.A.) 65-3405. In addition, it is a critical step in determining how the County will manage its solid waste over the next 20 years as the County's growth continues and market factors continue to evolve. Planning for and implementing an integrated solid waste management system is a complex and challenging endeavor requiring consideration of many factors: technological, institutional, legal, social, economic, and environmental. Furthermore, as communities pursue solutions to their solid waste management challenges, it is increasingly apparent that no single strategy, technology, or program offers a complete solution; rather, a combination of methods is needed to provide for appropriate and cost-effective management of the varying types of solid waste in accordance with the unique properties of these various solid waste stream components.

The County and its consultant, Burns & McDonnell, developed this SWMP with a focus on the next five years of implementation, understanding that it will be updated every five years. The SWMP has been developed in coordination with Unified Government of Wyandotte County/Kansas City, Kansas (Unified Government) staff and the Solid Waste Management Committee (SWMC). The SWMC is comprised of representatives from across the solid waste sector, representing local governments, environmental organizations, private sector, and citizens.

Overview, Goals, and Objectives

The stated goal of the SWMP is to develop fiscally responsible waste management methods consistent with the waste management hierarchy to achieve as much reduction, reuse, and diversion from disposal as feasible. This goal was developed by Unified Government staff and the SWMC. Figure ES-1 illustrates the United States Environmental Protection Agency (U.S. EPA) waste management hierarchy. This SWMP was developed keeping with the stated goal and waste management hierarchy. Section 1.0 provides additional details on stakeholder engagement, guidance for reading the SWMP, and key terms.

Figure ES-1: U.S. EPA Waste Management Hierarchy



Planning Studies, Regulatory, and Trends Review

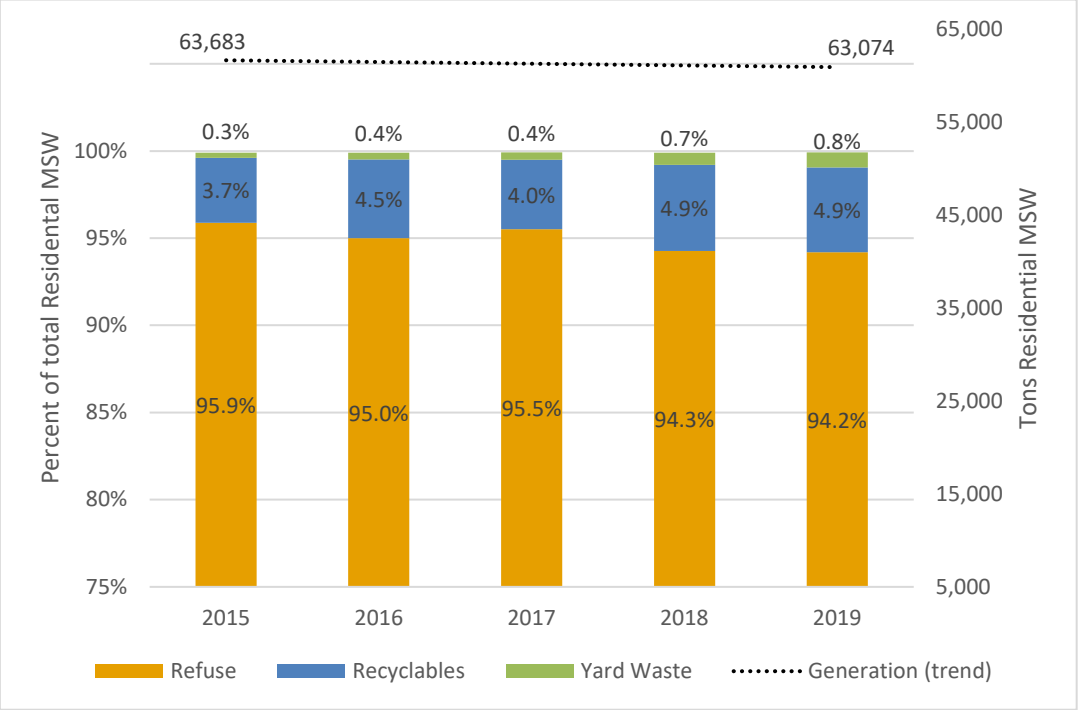
Understanding prior solid waste and community planning projects completed at the local, regional, and state levels is a critical step in effectively and efficiently developing the SWMP for the County. Prior solid waste regulations and policies, as well as the current regulatory climate and trends have largely shaped the state of solid waste management at various levels and define the environment in which this SWMP was developed. Section 2.0 provides a review of relevant solid waste studies and plans, a summary of relevant laws and regulations, a description of the roles of governmental entities in solid waste management and summarizes recent key trends in solid waste management. The key trends provide insight on how the industry is changing, as well as efforts being implemented by communities to address associated challenges.

Planning Area Characteristics

To properly plan for the County's future municipal solid waste (MSW) management needs, an understanding of the factors that will impact those needs is important. Section 3.0 describes the County's demographic and economic characteristics, as well as how these characteristics were applied to develop the County's current solid waste generation profile and future solid waste generation projections. With the County's population and employment projected to continually increase over the next 20 years, this information reinforces the importance for the County to develop and implement this SWMP that will guide solid waste management efforts over that time.

This SWMP has a significant focus on the residential sector. As shown in Figure ES-2, approximately 94 percent of residential MSW is disposed in landfills, with four percent recycled through curbside programs, two percent recycled through drop-off (recycling and yard waste), and small quantities (less than one percent) recycled through household hazardous waste and electronic waste programs. There is significant opportunity to impact diversion from the residential sector and there are various factors and methods for increasing recycling and yard waste diversion which are discussed throughout the SWMP.

Figure ES-2: Residential MSW Generation Trends, 2015-2019[1,2]

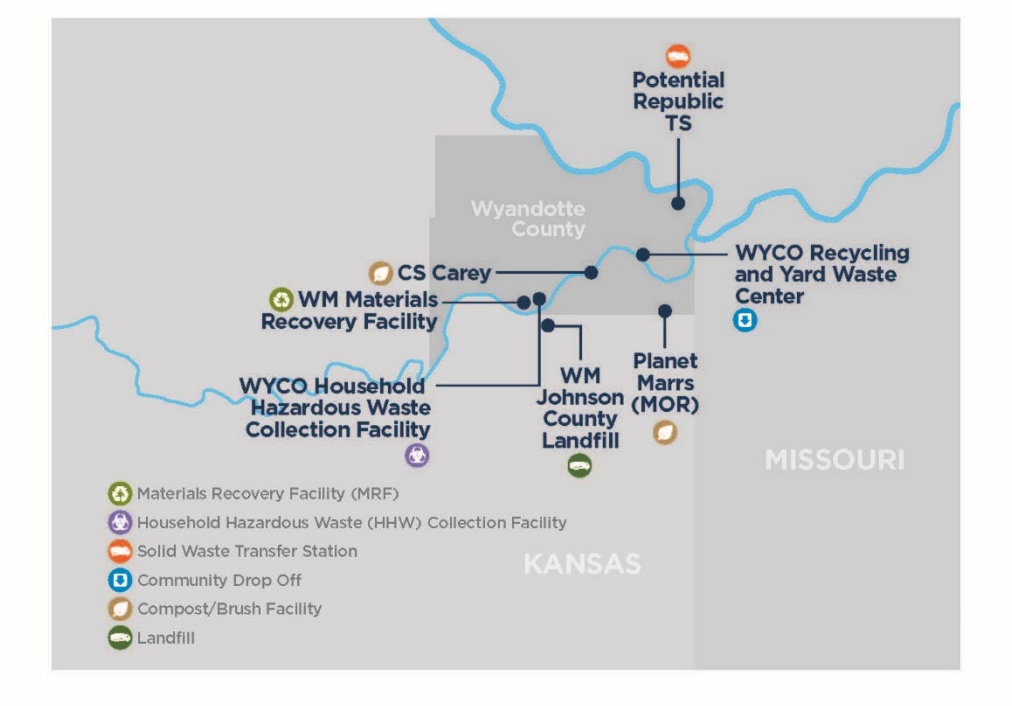


[1] Data primarily from the Wyandotte County Solid Waste Committee 2020 Annual Meeting, with supplemental facility data (e.g., Ripple Glass).
[2] Small quantities of HHW and e-waste (less than one percent of total generation for each year) are not reflected in the Figure.

Facilities

Section 4.0 provides an overview of existing MSW processing and disposal facilities located within the County and the surrounding region, including landfills, material recovery facilities (MRF), transfer stations, organics processing facilities, and HHW processing facilities. Figure 4-1 identifies locations of solid waste facilities utilized by Wyandotte County. Additional regional facilities and their remaining life are discussed within this section.

Figure ES-3: Solid Waste Facilities Utilized by Wyandotte County



Tracking the remaining capacity of facilities is critical to ensure adequate disposal and processing capacity in the future and plan for the development of new facilities as needed. This section also highlights opportunities for the County to engage in public-private partnerships to develop infrastructure needed for disposal and processing of materials.

Single-Family Residential

Each municipality in the County contracts residential solid waste services independently to a single private sector provider. The Cities of Edwardsville and Lake Quivira are each under their own contracts with a hauler to provide weekly trash and recycling collection in carts. The Unified Government oversees a collection contract for weekly trash and recycling services for residents of Kansas City and Bonner Springs, Kansas. The Unified Government is responsible for the management of the HHW Center, the Recycling and Yard Waste Center, and post closure care for multiple closed MSW landfills located within the County. The Unified Government has a desire to increase their role and expand staff dedicated to solid waste services based on the recommendations of this Plan. Residential solid waste collection services, discussed in Section 5.0 through 8.0, include curbside collection of refuse, single-stream recyclables, bulky items, and organics.

The County's diversion rate of 5.8 percent lags behind the state and national averages. The State of Kansas has a diversion rate of 31 percent, and the national average is 35 percent. This represents great

opportunity to increase the diversion in Wyandotte County by increasing participation in recycling and volumes collected per household.

It is recommended that Wyandotte County increase access to recycling through providing all residential customers with a recycling cart and through focused education and outreach around recycling and diversion. It is also recommended to separate yard trimmings from regular refuse collections for composting.

Commercial and Multifamily Residential

MSW generated by the commercial and multifamily sectors is discussed in Section 9.0. While multifamily properties are occupied by the residential sector, waste from these properties is comingled with commercial sector upon collection and therefore considered commercial waste. The County's commercial and multifamily properties contract for trash and recycling collection services through private haulers on an open market system. Recycling is an optional additional service and is not provided by all commercial haulers. There are currently no requirements for the provision of recycling services to commercial or multifamily properties, although, some properties choose to offer recycling collection services.

It is recommended that the County create a commercial hauler licensing program and require annual reporting of MSW quantities collected to be a provision of the license. This will lay the foundation for future diversion efforts and provide the County with a better understanding of the commercial generation data and where opportunities exist. It is also recommended that waste removal services be required as a provision of the current business licensing program. Increasing support for commercial and multifamily properties through online resources and a technical assistance program could increase participation in recycling and diversion.

Construction & Demolition (C&D)

There are no C&D landfills located in Wyandotte County, so all material generated is hauled out of county for disposal. There is no reporting requirement for hauling C&D waste, so the actual quantities generated within the County are unknown. Some portion of C&D debris generated within the County is diverted from landfill disposal through C&D recycling processing, but quantities are unknown. Section 10.0 describes the County's management of C&D materials. It is recommended that the County lead by example by requiring minimum standards for C&D recycling on all County funded projects as well as supporting end use markets by requiring recycled material (i.e., crushed concrete) used on all applicable

County projects. Education and outreach information for reuse and recycling should be included in all building permit applications.

Household Hazardous and Other Wastes

While HHW represents less than one percent of the residential waste stream generated in the County, the sound management of these wastes has significant impact on the environment. Materials such as paint, cleaning products, fertilizer, fluorescent bulbs, other chemicals are accepted at the County Household Hazardous Waste Facility. Section 11.0 describes this and the management of other wastes including lead acid batteries, white goods containing chlorofluorocarbons, pesticides and pesticide containers, motor oil, consumer electronics, and medical wastes. It is recommended that the County continue to provide monthly collection events and if financially feasible, consider expanding service to include weekly service hours of operation year-round with a permanent facility and staffing.

Public Education and Outreach

Providing effective public education and outreach to residents is critical for the ongoing success of the County's solid waste management system. Guidance and support from the County can shape proper participation and positive program engagement experiences for residents which increases customer satisfaction and enables progress toward the County's goals. Section 12.0 describes key points of customer engagement, potential methods for communication, key messaging, and strategies and recommendations.

Implementation Plan

A planning level Implementation Plan is provided in Appendix A which describe the specific activities associated with implementing each of the recommended strategies and options. For each activity listed in the Implementation Plan, the following additional information has been provided:

- Description of activity to be taken;
- Priority level;
- The timeframe for the activity to be carried out;
- Key action items and notes; and
- The responsible party(s).

The Implementation Plan is more detailed for the short-term recommendations, as compared to the medium and long-term recommendations. The Implementation Plan allows the Unified Government to

sort the activities by year, by responsible party, and by cost. In this way, it should be easy to review the activities in the Implementation Plan in different ways that aid in implementation.

1.0 OVERVIEW, GOALS, AND OBJECTIVES

1.1 Purpose

Goal

Develop fiscally responsible waste management methods consistent with the waste management hierarchy to achieve as much reduction, reuse, and diversion from disposal as feasible.

The updating of Wyandotte County's (the County's) Solid Waste Management Plan (SWMP) is required by the Kansas Department of Health and Environment (KDHE) every five years, as described in the Kansas Statutes Annotated (K.S.A.) 65-3405. In addition, it is a critical step in determining how the County will manage the solid waste generated over time as the County's growth continues and market factors continue to evolve. Planning for and implementing an integrated solid management system is a complex and challenging endeavor requiring consideration of many factors: technological, institutional, legal, social, economic, and environmental. Furthermore, as communities pursue solutions to their solid waste management challenges, it is increasingly apparent that no single strategy, technology, or program offers a complete solution; rather, a combination of methods is needed to provide for appropriate and cost-effective management of the varying types of solid waste in accordance with the unique properties of these various solid waste stream components. The Unified Government of Wyandotte County/Kansas City, Kansas (Unified Government) and its consultant, Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell), developed this SWMP to meet the requirements of KDHE and with a focus on the next five years of implementation, understanding that it will be updated every five years.

1.2 KDHE Plan Requirements

As described in Section 1.1, updating of the County's SWMP is required by KDHE, as described in K.S.A 65-3405. Additional plan requirements are described in Kansas Administrative Regulations (K.A.R.) 28-29-75 through 28-29-82. Meeting such plan requirements was central to the development of this SWMP. Plan requirements and required components are primarily addressed and included in the body of the SWMP. The Implementation Plan is provided as Appendix A. Additional requirements and background information are included in Appendix B, Supporting Plan Information.

1.3 Stakeholder Engagement

The SWMP has been developed in coordination with Unified Government staff and the Wyandotte County Solid Waste Management Committee (SWMC). Committee members include representatives from the Unified Government Board of Commissioners, Cities of Bonner Springs, Edwardsville, and

Kansas City, Board of Public Utilities, solid waste private sector, environmental organizations, and the public. The current members of the SWMC membership as of 2019 is provided in Table 1-1.

Table 1-1: SWMC Members (2019)

Name	Representing Organization
Christina Brake	City of Bonner Springs, Kansas
Michael Webb	City of Edwardsville, Kansas
Zack Daniel	City of Edwardsville, Kansas
Michael Tobin	Unified Government
Greg Talkin	Unified Government
Kirk Suther	Unified Government
Maureen Mahoney	Unincorporated Area
Ingrid Setzler	Board of Public Utilities
Mark Donahoo	Republic Services
John Blessing	Waste Management
Richard Mabion	Sierra Club
Lou Braswell	Leavenworth Road Association
Norman Scott	Stony Point/Hunters Glenn Neighborhood
Stephanie Moore	General Public

Throughout the preparation of this report, the County and Burns & McDonnell met with the SWMC to facilitate three public workshops. The workshops focused on communicating collected data to the committee, reviewing and evaluating options relating to various solid waste management sectors, and discussing details regarding the implementation of options selected with the committee. Feedback received by the committee members was key in understanding community needs and perspective and evaluating potential strategies and service options.

1.4 Guidance for Reading of SWMP

Section 2.0 provides a description of the applicable planning studies and regulations, roles of government entities in solid waste management, and current solid waste management industry trends. Section 3.0 highlights the planning area characteristics such as population and economic projections, current and projected solid waste generation, and methodology utilized. Section 4.0 provides an overview of existing

municipal solid waste (MSW) processing and disposal facilities located within the County and the surrounding region, including landfills, material recovery facilities (MRF), transfer stations, organics processing facilities, and household hazardous waste (HHW) processing facilities. Sections 5.0 through 12.0 are each dedicated to discussion of a specific sector or material type for which solid waste needs to be managed within the County. Sections 5.0 through 12.0 address the following sectors: single-family residential refuse, residential recycling, bulky items, organics, commercial and multifamily residential, construction and demolition (C&D), household hazardous waste (HHW) and other special wastes, and education and outreach. Each sector has unique characteristics requiring a customized approach to solid waste management for its customers and material types. These "sector sections" begin with a current system review and an evaluation of options for implementation. These sections then present proposed recommendations and associated action items. Appendix A details the implementation plan for each of the recommendations discussed in the "sector sections" and includes the specific roles, responsibilities, schedules, costs, and other organizational issues associated with the implementation plan.

1.5 Key Terms

This section presents definitions of a selection of key terms used throughout the SWMP that are necessary for a comprehensive understanding of the current solid waste management systems and strategies that may be implemented in the future.

Sectors. Municipal solid waste (MSW) is broadly categorized into two primary sectors, residential and commercial. C&D debris is not considered MSW and is handled and disposed of separately from residential and commercial MSW material. The total waste generation forecast was developed based on residential MSW, commercial MSW, and C&D debris categories.

- **Residential Sector.** The residential sector includes only material generated by single-family households.[1]
- **Commercial Sector.** The commercial sector includes material generated by commercial (offices, retail and wholesale establishments, restaurants, etc.) and institutional (schools, libraries, hospitals, etc.) entities as well as by residents living in multifamily structures. Multifamily solid waste is collected, processed, and reported in combination with other commercial material and was therefore included in the commercial sector. Generally, solid waste data specific to multifamily households was not available.

[1] Single-family households are defined as traditional single-family homes and structures containing 1-4 individual housing units (e.g., duplexes, townhomes).

Construction and Demolition (C&D) Debris. C&D debris is excluded from residential and commercial sector MSW quantities and is therefore addressed in a separate section, Section 10.0, of this SWMP. C&D debris is generated by the construction, renovation, and demolition of residential and non-residential structures as well as city, county, and state road and bridge projects and is further defined in the Materials portion of this section.

1.6 Generation, Recycling, and Disposal

This section provides definitions used regarding the total amount of solid waste generated within the County and the material disposal or processing streams that comprise total generation quantities.

- **Generation.** Solid waste generation is the total quantity of material disposed in landfills plus the total quantity of material recovered through recycling and composting operations. Total generation is the quantity of material that the County must manage through various disposal and recycling programs and services. Reuse material quantities are not included in generation because quantities are unknown.
- **Recycling.** Recycling rate is defined as the proportion of MSW that is diverted from landfill disposal and has value as a commodity or as an input into other products or processes. There are various methods for measuring recycling rates (as discussed in the "Recycling Measurement" portion of Section 2.4.4). In this SWMP, recycling and recycling rates include MSW material that is collected and processed through single-stream recycling programs and materials recovery facilities (MRFs) and yard waste and organics material that is mulched, composted, or otherwise diverted from landfill disposal. Recycling rates do not include any materials that are diverted from landfill disposal through reuse activities. Quantities of reused MSW and C&D materials are difficult to measure.
- **Disposal.** Disposal refers to all remaining material placed in landfills that has not been recycled, composted, or otherwise diverted. Disposed materials include some quantities of materials that were not recovered prior to disposal but could potentially be recovered through improvement of recycling programs, infrastructure, or education. Potential for additional recyclable material recovery from disposed materials is discussed further in Section 3.6, Waste Characterization.

1.7 Materials

MSW is composed of several categories of solid waste and recyclables that are handled through various collection, disposal, and processing methods and facilities, depending on the material category. This section provides definitions for the primary categories of MSW addressed in this SWMP and defines C&D debris separately because C&D debris is not considered a component of MSW.

- **Municipal Solid Waste (MSW).** MSW refers to the entirety of the waste stream that is generated by everyday activities in the residential and commercial sectors. MSW can be further categorized by material types including refuse, single-stream recyclables, organics, and HHW. Different MSW material types require different methods for best management practices. Refuse is disposed in MSW landfills. Much of the MSW generated can be recycled or composted at various processing facilities. MSW does not include commercial hazardous waste or industrial, agricultural, mining, or sewage sludge wastes.
    - **Refuse.** Refuse is the portion of MSW that cannot practically be recycled, reused, or otherwise diverted from disposal. True refuse has no viable handling methods other than disposal in an MSW landfill. However, in most communities, a portion of material disposed as refuse has the potential to be recycled. Waste characterization and potential for increased recovery of recyclable materials from materials currently disposed in landfills is further addressed in Section 3.6.
    - **Single-Stream Recyclables.** Single-stream recyclables refers to materials that are typically accepted through municipal curbside recycling programs or drop-off locations, processed through MRFs, and sold as commodities to markets where the material is then repurposed. Single-stream recyclables include items such as, but are not limited to, plastic containers, aluminum and steel cans, cardboard, and other various paper products. The full range of materials accepted through a municipality's single-stream recycling program can vary by community or by hauler.
    - **Organics.** Organics are plant or animal-based materials. Organics have the potential to be diverted from landfill disposal through composting or mulching processes. Within the category of organics, there are the two sub-categories of yard waste and food waste. Vegetative material generated from the residential sector, commercial sector, or parks maintenance is categorized as yard waste, including materials such as leaves, grass clippings, limbs, brush, and other plant trimmings. Food waste includes materials such as fruits and vegetables, meats, eggs and dairy, coffee grounds, and food-soiled paper products such as napkins, pizza boxes, and various types of cardboard and paper food containers. Depending on available processing options, yard waste and food waste may be processed together or separately.
    - **Household Hazardous Waste (HHW).** HHW refers to common household chemicals or other materials that should not be disposed of in MSW landfills due to their potential for adverse environmental and health impacts. They require special processing by an entity permitted by KDHE. HHW includes, but is not limited to, materials such as paints, fertilizers,

pesticides and poisons, pool chemicals, household cleaners, automotive fluids, batteries, light bulbs, and e-waste. Section 11.0 addresses additional types of HHW and other special wastes as well as management options for these wastes within Wyandotte County. HHW generally does not include chemicals generated by commercial or industrial entities, though some processors may accept materials from small commercial facilities.

- **Construction and Demolition (C&D) Debris (as a material).** C&D debris is not included in the category of MSW. C&D debris is defined as solid waste resulting from the construction, remodeling, repair, and demolition of structures, roads, sidewalks, and utilities. Material is generated from residential, commercial, and public sector (e.g., municipal, state, or federal) projects. It includes, but is not limited to, materials such as brick, roofing materials, wood, flooring, drywall, non-asbestos insulation, concrete, and asphalt. Most C&D debris is disposed in separate C&D permitted landfills. Smaller amounts may be recycled or reused.

2.0 PLANNING STUDIES, REGULATORY, AND TRENDS REVIEW

This section provides a broad perspective of the historic and current state of the solid waste management environment in which the County is developing this Plan. It provides a review of relevant existing planning studies, a summary of relevant laws and regulations, and summarizes recent key trends in solid waste management.

2.1 Review of Prior Planning Documents

Understanding prior solid waste and community planning projects completed at the local, regional, and state levels is a critical step in effectively and efficiently developing the SWMP for the County. To inform development of this SWMP, Burns & McDonnell reviewed the following studies and plans.

State of Kansas Solid Waste Management Plan. The State of Kansas Solid Waste Management Plan was first developed in 1996, updated in 2000, 2005, 2010 and 2016. The draft 2020 plan[2] was available and reviewed at the time of Plan development. The purpose of the State Plan is to facilitate the development of environmentally sound and cost-effective methods for managing and reducing solid waste in cooperation with local governments.

Wyandotte County Solid Waste Management Plans and annual updates. The first Wyandotte County SWMP was developed in 1997. It was reviewed and comprehensively updated in 2004, 2010 and 2015. The Plan was also reviewed annually to document implementation progress and document any changes. The 2015 Wyandotte County Solid Waste Management Plan focuses on maintaining the existing solid waste management structure and promoting waste reduction through education and outreach. No major changes were recommended in the 2015 Plan or previous plans.

Plan implementation efforts discussed in previous Plans focus on the continuation of existing programs, including:

- Residential solid waste services with a single provider which includes the collection of unlimited weekly volumes of waste and separate collection of recyclable materials for single-family residents in Kansas City and Bonner Springs, Kansas.
- Operation of a County-owned Recycling and Yard Waste Center available to residential customers only and an agreement to accept yard waste material at Waste Management's facility from Wyandotte County residents.

[2] https://www.kdhe.ks.gov/596/Solid-Waste-Program

- Operation of a County-owned HHW collection facility, available to residents, one Saturday a month, seven months out of the year.
- Operation of an illegal dumping response program, Quick Response Trash Team, in coordination with the County Code Enforcement Department.
- Biannual electronic waste collection events.
- Promotion of Livable Neighborhoods' recycling bin rental program for special events. Plan implementation efforts related to waste reduction includes:
    - Development of an internal webpage for Unified Government staff awareness on waste reduction and recycling in County-owned facilities.
    - Creation of several documents shared with the public online; topics include residential recycling, recycling in schools, recycling for businesses and yard waste management.
    - Articles published in locally distributed periodicals.
    - Distribution of recycling bins to residents, available at no cost at the Neighborhood Resource Center.
    - Partnering with educational programing organizations to deliver recycling-based educational programs.
    - Educational classes on yard waste management provided by the K-State Research and Extension of Wyandotte County.
    - Partnerships with a variety of local organizations working on food waste reduction through distribution and composting.

2.2 Review of Prior Studies

Review of Unified Government Residential Solid Waste Collection Services: In 2019, Burns and McDonnell was retained to perform a review of the residential solid waste collection services contracted to Waste Management. The study provided recommendations to improve collection service through continued coordination with Waste Management, contract optimization efforts and community engagement.

Unified Government Tree Management System: Unified Government developed a tree management system plan to address tree debris generated from private and public property. Policies and programs addressing storm debris, public utility maintenance debris, emerald ash borer debris, and debris from trees in public parks are thoroughly reviewed and assessed for efficient handling and disposal.

Johnson County Waste Characterization Study: In 2015-2016, Engineering Solutions and Design Incorporated conducted a waste characterization study at the Johnson County Landfill. The purpose of the

study was to analyze the composition of waste streams on a detailed level. Representative samples were evaluated from each community including Wyandotte County, which then allowed that information to guide future solid waste planning efforts. Waste characterization results provide an understanding of the types and quantities of recyclable materials that are currently being disposed in landfills, and therefore the potential for increased material recovery and increased recycling rates.

Mid-America Regional Council, Various Reports. The Mid-America Regional Council (MARC) has developed multiple reports assessing the state of the solid waste system within the Kansas City metro area and providing strategic recommendations. The following reports were reviewed in the development of this SWMP:

- MARC Solid Waste Management District Recycling Survey Final Report (2017);
- Recycling Economic Information Study for the Kansas City Metro Area (2016);
- Waste Diversion Assessment Summary of Community Benchmarking (2014);
- MARC Solid Waste Management District Recycling Survey Final Report (2012);
- Strategy for Sustainable Solid Waste Management (2009); and
- Strategic Directions and Policy Recommendations for Solid Waste Management in the Bistate Kansas City Metropolitan Region (2003).

2.3 Regulatory and Policy Review

Prior solid waste regulations and policies, as well as the current regulatory climate and trends have largely shaped the state of solid waste management at various levels and define the environment in which this SWMP was developed. This section provides a summary of federal, state, and local regulations, policies, and trends.

2.3.1 Role of the Federal Government in Regulating Solid Waste

The federal government sets basic requirements to provide consistency among states and regulations to protect public health and the environment. The United States Environmental Protection Agency (U.S. EPA) is responsible for hazardous and non-hazardous solid waste management through the Office for Solid Waste and Emergency Response (OSWER). Major federal legislation pertaining to solid waste management includes:

- Prior to 1965, solid waste management was entirely dependent on the judgement and decisions of individuals or local departments of health and sanitation. In 1965, Congress made its first attempt to define the scope of the nation's waste disposal problems by enacting the Federal Solid Waste Disposal Act (SWDA), which financed statewide surveys of landfills and illegal dumps.

- The first significant federal legislation governing the disposal of non-hazardous and hazardous waste was passed in 1976 under the Resource Conservation and Recovery Act (RCRA). RCRA established landfill construction, management, and closure guidelines as well as regulates hazardous waste management facilities that treat, store, or dispose of hazardous waste. RCRA has been amended three times since its inception[3]:
  - 1984 Hazardous and Solid Waste Amendments, requiring the phasing out of land disposal of hazardous wastes and granting the U. S. EPA regulatory authority over landfills (Subtitle C Hazardous Waste and Subtitle D Non-hazardous waste);
  - 1992 Federal Facility Compliance Act, strengthening enforcement of RCRA at federal facilities; and
  - 1996 Land Disposal Program Flexibility Act, providing regulatory flexibility for land disposal of certain wastes.
- The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, known as Superfund, was enacted by Congress to address abandoned hazardous waste sites in the U.S. CERCLA has subsequently been amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). [4] The Office of Air and Radiation regulates solid waste-related air emissions, enforcing the Clean Air Act of 1976 (CAA) and subsequent amendments.

2.3.2 Role of the State Government in Regulating Solid Waste

KDHE, Bureau of Waste Management is responsible for regulatory permitting and enforcement at all solid waste facilities to ensure they are operated in a manner that protects human health and the environment. Permitted facility types include composting, C&D, HHW, incinerator, industrial, landfarm, medical waste, mobile tire processor, MSW-subtitle D, solid waste processor, tire collection center, tire monofill, tire processing facility, tire transporter, and transfer station. Additionally, KDHE is tasked with state and local solid waste planning, waste reduction efforts, solid waste clean-ups, and administering grants.

As required by law, KDHE adopted a state-wide SWMP which is reviewed and comprehensively updated every five years. The State's Plan is based upon the concept that major decisions related to solid waste management in Kansas should be made at the local level.

[3] U.S. Environmental Protection Agency. 2017. "History of the Resource Conservation and Recovery Act (RCRA)." Available online: https://www.epa.gov/rcra/history-resource-conservation-and-recovery-act-rcra
[4] U.S. Environmental Protection Agency (U.S. EPA). 2017. "Superfund: CERCLA Overview." Available online: https://www.epa.gov/superfund/superfund-cercla-overview

House Bill No. 2801 amended K.S.A Chapter 65, Public Health, July 1, 1992. K.S.A. 65-3405(i), states the following:

> Each county or group of counties is required to adopt and implement a solid waste management plan pursuant to this section and is responsible for continued and ongoing planning for systematic solid waste management within the boundaries of such county or group of counties. The solid waste management plan of each county, designated city or group of counties shall provide for a solid waste management system plan to serve all generators of solid waste within the county or group of counties.

Further, K.S.A. 65-3405 requires the development of a solid waste management committee in each county. The committee is responsible for the development of the SWMP, the annual review of the plan, and an update to the SWMP every five years. A public hearing is required with each five-year update to the SWMP. Additional requirements of the SWMP are included in Section 1.2.

2.3.3 Role of County/City Government in Regulating Solid Waste

The Unified Government oversees a collection contract for weekly trash and recycling services for residents of Kansas City and Bonner Springs, Kansas. The Public Works Department investigates customer complaints regarding missed collections and enforces the terms of the contract to encourage appropriate collection of residential waste. The Public Works Department is also responsible for the management of the Household Hazardous Waste Center, the Recycling and Yard Waste Center, and post closure care (PCC) for multiple closed MSW landfills located within the County.

The cities of Edwardsville and Lake Quivira each oversee their own respective municipal residential collection contracts.

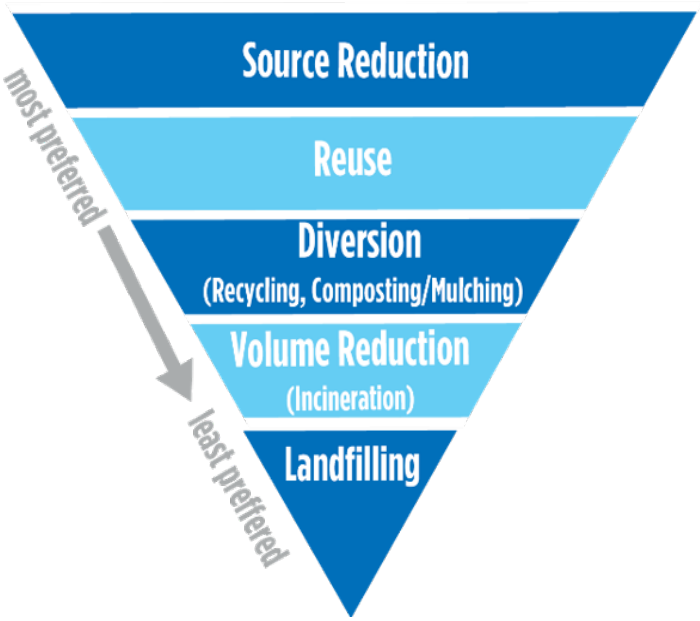
As required by K.S.A. 65-3405, the County has a SWMC that includes representatives from cities, unincorporated areas, citizen organizations, private industry, and the general public. The committee members are appointed by the Unified Government Board of Commissioners (BOC). With the support of Unified Government staff, the SWMC is responsible for the development of the SWMP, annual review of the SWMP, and providing a report containing the results of the annual SWMP review to the BOC. The SWMP is then implemented by staff under the direction of the BOC. Please refer to Section 1.3 for information about the SWMC's involvement in the development of the SWMP.

2.4 Solid Waste Management Industry Trends

This section provides perspective on solid waste management trends that may influence the development of the SWMP and the industry moving forward.

2.4.1 Overarching Trends

Figure 2-1: U.S. EPA Waste Management Hierarchy



Waste Management Hierarchy. The waste management hierarchy developed by the U.S. EPA as shown in Figure 2-1, has also been adopted by many communities as a guide in managing municipal solid waste. This hierarchy is used as a tool in implementing a sustainable materials management (SMM) approach to waste management. The hierarchy was developed in recognition that no single waste management approach is suitable for managing all materials and waste streams in all circumstances. The hierarchy ranks the various management strategies from most to least environmentally preferred. It places emphasis on reducing, reusing, and recycling as key to SMM.[5]

Sustainable Materials Management. Sustainable materials management (SMM) is a systematic approach to using and reusing materials more productively over their entire lifecycles.[6] SMM represents a change in how communities think about the use of natural resources and environmental protection, and goes beyond traditional thinking about waste reduction, reuse, recycling, and disposal. SMM emphasizes consideration of a product or material's entire lifecycle, from manufacturing to disposal, and the need to make sustainable choices throughout the lifecycle. An SMM approach seeks to:

- Use materials in the most productive way with an emphasis on using less;
- Reduce toxic chemicals and environmental impacts throughout the material life cycle; and
- Provide sufficient resources to meet today's needs and those of the future.

[5] U.S. Environmental Protection Agency, 2017. "Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy." https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy.
[6] U.S. Environmental Protection Agency (U.S. EPA). 2017. "Sustainable Materials Management Basics." https://www.epa.gov/smm/sustainable-materials-management-basics.

It has been a trend for the solid waste and recycling industry for SWMPs to have the broader view of SMM to better plan for their community's economic and environmental future.

2.4.2 Collection Trends

Pay-As-You-Throw. The purpose of a volume-based variable rate structure, also known as a pay-as-you-throw (PAYT) program, is to incentivize waste reduction or waste diversion by offering a financial enticement to customers who maintain a fixed weekly maximum set out volume.

While PAYT is the national trend, the Unified Government has a contract until January 2033 that allows residents to pay for waste collection at a set rate, regardless of how much—or how little—trash they generate.

Contracting for Services vs. Municipalization. In the Midwest, many communities either provide publicly operated solid waste services, contract for services through a single private hauler or have an open market system in which several private haulers operate within a permitted or open system. An open market system is common for commercial services. Generally, communities of a smaller size may choose to contract for MSW services, likely due to limited resources available for operation of a municipal system. Among some smaller cities and many cities with higher populations, there is a split between those that have municipally and privately provided services.

Wyandotte County has chosen to contract with one company as its exclusive provider for residential services. This approach is consistent with communities of comparable size. In the greater Kansas City metro area, only the cities of Olathe, Lawrence and Kansas City, Missouri provide municipal hauling services.

2.4.3 Facility Trends

Landfill Trends. As regulations become more restrictive and it becomes increasingly more challenging to obtain permits for new landfills, the solid waste industry is seeing an increase in the expansion of landfills by going higher (vertical expansion) and/or wider (horizonal expansion). Landfill owners are seeking to extend facilities' useful lives by expanding the footprint, improving operations or through use of technologies, such as enhanced leachate recirculation (a process where liquids or air are added into a landfill to accelerate degradation of the waste, prolonging site life). Landfill owners and regulators are also looking beyond the prescriptive 30-year post-closure care (PCC) period and are recognizing that there may be additional long-term management costs and liabilities incurred by landfill facilities after the 30-year PCC period.

Landfill Tipping Fees. Based on a 2019 study conducted by the Environmental Research & Education Foundation (EREF)[7], average per-ton landfill tipping fees in Kansas are lower than the national average, and lower than average landfill tipping fees in the Midwest region (Minnesota, Illinois, Missouri, Wisconsin, Iowa, Indiana, Ohio, Nebraska, Kansas and Michigan). The rates shown in Table 2-1 reflect average posted gate rates at surveyed landfills. Negotiated tipping fees between a landfill and individual haulers may be lower.

Table 2-1: Average Per Ton Landfill Tipping Fees

	Per Ton
Kansas	$39.32
Midwest Region	$48.87
United States	$55.36

Use of Transfer Stations. Transfer stations are facilities that are used to consolidate material from multiple collection vehicles into larger, high-volume transfer vehicles for more economical shipment to distant disposal or processing facilities. Transfer stations can be used for material destined for landfilling, recycling and/or composting. With a nationwide trend toward larger disposal and processing facilities, there has been an enhanced need for transfer facilities. When longer transport distances are required to send materials to facilities, transfer stations allow collection vehicles to be more productive by maximizing the amount of time spent collecting material rather than driving to a facility. Key factors that affect the financial feasibility of transfer stations include:

- Collection cost;
- Disposal/processing cost;
- Distance/travel time to landfill or processing facility;
- Fuel costs;
- Annual tonnage hauled; and
- Payload of transfer trailers versus collection vehicles.

2.4.4 Diversion Trends

Recycling. Local governments offer recycling programs because their citizens look for effective community services and demand is higher than ever before. Increasing recycling requires that more residents and commercial establishments participate in the existing programs and that more materials are

[7] Environmental Research & Education Foundation, 2019. "Analysis of MSW Tipping Fees, April 2019." www.erefdn.org

collected from each participant. For the residential sector, there needs to be more recycling bins at the curb with more material in each bin. Increased participation can be accomplished through several approaches:

- Public education and awareness to encourage behavioral changes;
- Providing recycling infrastructure that encourages recycling; and
- Contractual, licensing, or regulatory methods to require behavioral changes.

Residential and commercial recycling infrastructures have been increasing in Wyandotte County, and it is assumed in this Plan that these systems will not only continue but could expand to accommodate larger quantities of recovered materials. Despite the widespread availability of curbside recycling, there is a need to increase awareness among Wyandotte County residents.

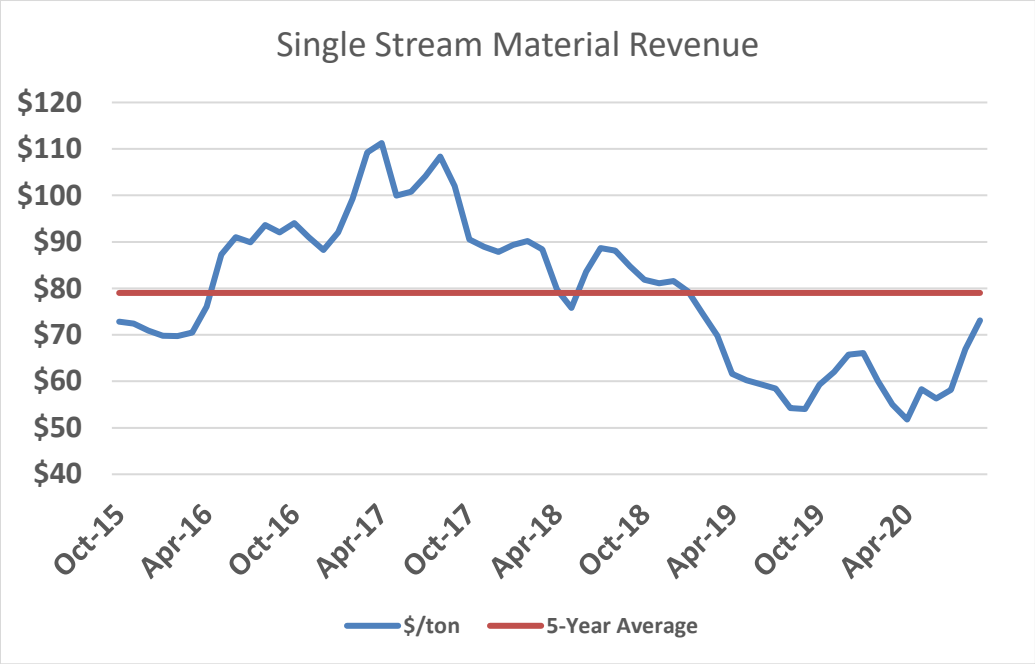
Increasing commercial sector participation in existing recycling programs through educational efforts requires coordination with the private sector. Commercial sector recycling is handled almost exclusively by the private sector, as is the case in Wyandotte County. Although many commercial establishments have recycling containers on-site, there are significant opportunities for additional containers to be sited.

Recycling Processing Fees. The per-ton fee paid for processing of recyclable materials collected is impacted by various factors, including the market value of recovered materials and the level of contamination present. Over the past 10 years, the changing market value of recovered materials has had a significant impact on single stream material (commingled collection of paper, plastics, metal, and glass) processing costs.

MRFs traditionally charged a cost per ton for processing recyclable materials and then offered a share of revenue generated through sale of the material back to municipalities (where municipalities facilitated organized recycling contracts). At the beginning of the 2008 recession, the market value of recyclable materials plummeted dramatically, from record highs to record lows. MRFs were no longer able to cover the entirety of their processing costs from processing fees plus material revenue sharing, and some MRFs experienced negative cash flows. Because of the dramatically reduced market values of recovered materials, many MRFs changed their cost recovery structure, and began charging higher processing fees that would fully recover all processing costs, rather than relying on material revenues to be made whole. MRFs were then typically willing to offer municipalities a greater share of material revenues. As a result, processing fees have increased to amounts ranging from $70-$120 per ton (up from $30-$40 per ton prior to 2008).

The average blended market value of processed recyclable materials collected as a single stream (paper, plastics, metal, and glass) in the Midwest region over the last five years was $79 per ton. In addition to commodity values, the value of single stream materials varies based on the composition of the materials (i.e. quantity of paper, plastics, metal, and glass) and quality of the materials. Figure 2-3 illustrates the changes in the average value of single stream materials from 2015 to 2020. During 2021, recycling commodity prices rebounded strongly, exceeding the high points from the preceding five-year period. Key reasons for the increasing value have included the development of new infrastructure and seeks recycling material as a feedstock and trends toward increasing recycling content based on Environmental, Sustainability, and Governance (ESG) policies.

Figure 2-2: Single Stream Material Revenue (per Ton)



Recycling Measurement. Efforts to measure recycling have traditionally calculated a recycling rate. A recycling rate indicates the percentage of waste generated that is recycled and is typically calculated using the formula: [Total Recycled / (Total Recycled + Total Disposed)] x 100 = Percent Recycling Rate. Over the past decade, there have been several changes in the weights and composition of materials in the waste stream. For example, there is typically less newspaper, but more cardboard. Plastic bottles and aluminum cans weigh less. Some consumer packaging contains multiple materials, making recycling more challenging. Due to these reasons, some communities are considering alternatives to recycling measurement, other than calculating a recycling rate. Some alternative measurement options include:

- **Capture Rate**: Percentage of recyclable material that is recycled versus disposed;
- **Disposal Rate**: Based on per capita/employee disposal quantities;
- **Participation Rate**: Based on how often a resident or business recycles over a defined time period (e.g. monthly);
- **Life-Cycle Analysis**: Analysis of the total environmental impacts associated with a product or process, and evaluation of opportunities to reduce impacts throughout the life-cycle, through methods such as using recycled rather than virgin materials for inputs;
- **Greenhouse Gases**: Quantification of greenhouse gas reductions through both increased use of recycled materials as product inputs (life-cycle analysis) and reduction of material landfilled, which reduces generation of greenhouse due to decomposition; and

Yard Waste Diversion. Composting is a common environmentally sound way to manage yard waste. Yard waste includes materials such as leaves, grass clippings, brush and tree limbs. Composting diverts material from the landfill and it also effectively converts yard wastes into a useful soil additive or mulch.

The single most effective source reduction measure is management of yard waste on-site. Leaving all grass clippings and leaves on the lawns with a mulching mower and use of backyard compost bins reduces MSW generation for disposal. Education programs are commonly used to promote on-site management of yard waste.

Landfill disposal bans or composting mandates are also effective tools to drive yard waste composting. Many communities and states have yard waste landfill bans including the state of Missouri and Johnson County, Kansas (The Unified Government has an agreement with Johnson County to send residential MSW comingled with yard waste to the Waste Management Johnson County Landfill).

Curbside collection of residential yard waste for composting is particularly limited in Wyandotte County. Residents can self-haul to one of two drop off sites for free.

A challenge facing the composting industry is identifying viable end markets for the processed materials. To market the material, facilities must generate a high value finished product which can incur high processing costs. Lower quality compost may instead be used as landfill alternative daily cover, as is the case at the Johnson County Landfill.

3.0 PLANNING AREA CHARACTERISTICS

Planning for the County's future solid waste management needs requires an understanding of projected growth that will impact the quantities of waste generated, disposed, and recycled within the County. Per K.S.A. 65-3045.d., it is required that each County project waste generation over the next 10 years to address future needs; however, it is recommended to look longer term (25 years) to address the timeline required for new facility and program development, if needed. Population and economic growth will largely determine the level of growth in solid waste generation that will occur within the County over the next 25 years (through 2045). This section describes the County's current and projected residential population, as well as current and projected economic growth based on employment. It then describes how these characteristics were applied to develop the County's current solid waste generation profile and future solid waste generation projections. Burns & McDonnell utilized current solid waste generation data and a selection of existing population and employment projections to develop the solid waste generation projections for the County, presented in Section 3.4 and Section 3.5.

3.1 Demographic Characteristics

This section describes the County's historic, current, and projected demographic characteristics, including population and household distributions.

3.1.1 Historic and Current Population

Wyandotte County is the fourth most populous county in the state of Kansas, with a 2018 total population of approximately 164,300, based on estimates from the U.S. Census Bureau. In comparison, the two largest counties in Kansas (Johnson County and Sedgwick County) each have populations exceeding 500,000 based on recent U.S. Census Bureau estimates. Approximately 92 percent of County residents live in Kansas City, which is the third most populous city in the state of Kansas and has a 2018 total population of approximately 152,000.[8]

Historically, the County experienced steady population growth through the 1960s, after which the County population declined until 2010. In recent years, the County has experienced renewed population growth. Table 3-1 shows historic population and growth rates of Kansas and Wyandotte County each decade since 1970, with projected growth through 2020.

[8] 2018 total county populations data source: U.S. Census Bureau, 2014-2018 American Community Survey (ACS) 5-Year Estimates.

Table 3-1: State & County Historic Population & Growth by Decade[1]

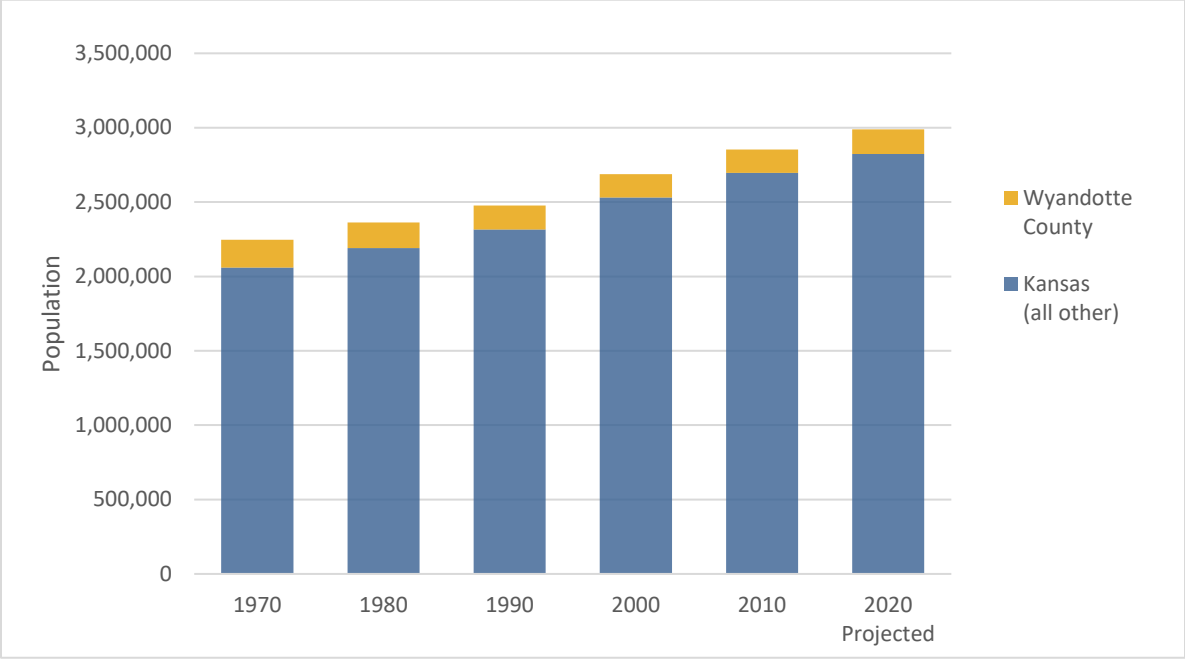
	1970	1980	1990	2000	2010	Projected 2020[2]
Kansas						
Population	2,246,578	2,363,679	2,477,574	2,688,418	2,853,118	2,988,194
10-Year Growth		5.2%	4.8%	8.5%	6.1%	4.7%
Wyandotte County						
Population	186,845	172,335	161,993	157,882	157,505	165,288
10-Year Growth		-7.8%	-6.0%	-2.5%	-0.2%	4.9%

[1] Data for years 1970-2010 is based on U.S. Census Bureau, Decennial Census Total Populations.

[2] 2020 projected populations and growth rates are based on the Mid-America Regional Council (MARC) previously developed 2040 Forecast for Wyandotte County (http://www.to2040.org/forecast.aspx) and Wichita State University's Center for Economic Development and Business Research Population Projections for the state of Kansas (http://kansaseconomy.org/local-forecasts/population-forecast).

Figure 3-1 compares the population growth of Wyandotte County with that of the state as a whole. Over the past few decades, Wyandotte County has dropped from approximately eight percent of the state's total population to a projected six percent in the year 2020.

Figure 3-1: Wyandotte County and Total Kansas State Population, 1970-2020



Wyandotte County covers 151 square miles and includes four incorporated cities (Bonner Springs, Edwardsville, Kansas City, and a portion of Lake Quivira) [9]. Nearly all (99.9 percent) of the County's population resides within the incorporated cities with 92 percent of the County's population in Kansas City alone. Additionally, Wyandotte County includes one township (Delaware) and unincorporated communities (e.g., Loring) comprising of less than 0.1 percent of the County population. Table 3-2 provides selected historic populations by city from 2010 through 2018.

Table 3-2: Wyandotte County Population Growth by City, 2010-2018[1]

City	Population			Compound Annual Growth Rate, 2014-2018
	2010	2014	2018	
Bonner Springs	7,308	7,420	7,723	0.7%
Delaware	31	69	37	2.2%
Edwardsville	4,340	4,367	4,462	0.3%
Kansas City	145,786	147,598	152,069	0.5%
Lake Quivira	40	12	54	3.8%
Wyandotte County Total Population	**157,505**	**159,466**	**164,345**	**0.5%**

[1] Source: U.S. Census Bureau. 2010 population from the 2010 Decennial Census Total Population estimates. 2014 and 2018 populations from the 2014-2018 American Communities Survey (ACS) 5-year estimates.

Household Distribution by Residential Sector. Many municipal planning efforts, including solid waste management, categorize residential populations into two general categories – single-family and multifamily. For Wyandotte County, the single-family population is defined as people living in single-family (1-unit) homes or structures with four or fewer housing units. The multifamily population is defined as people living in structures with five or more housing units, or in mobile units.

This distinction is important because multifamily MSW requires separate planning and management than that of the single-family sector. Generation and recycling patterns differ from single-family, and multifamily material is typically collected and managed in combination with commercial material. For purposes of current and projected waste generation estimates, the residential sector includes only MSW generated by single-family residents. Commercial sector solid waste estimates and projections are inclusive of multifamily and commercially generated MSW. Additional considerations for the single-family, multifamily, and commercial sectors are provided in each respective section of the SWMP.

[9] Wyandotte County, Kansas. Retrieved May 2020 from https://www.wycokck.org/Facts.aspx

Table 3-3 presents the 2018 estimated single-family and multifamily distribution of occupied households for each city and for Wyandotte County overall.[10]

Table 3-3: Single-Family and Multifamily Housing Distribution by City

City	2018 Population[1]	Occupied Housing Units[2,3]			Occupied Housing Unit Distribution[4]	
		Total	Single-family[5]	Multifamily	Single-family[5]	Multifamily
Bonner Springs	7,723	2,894	2,517	377	87%	13%
Delaware	37	18	18	-	100%	-
Edwardsville	4,462	1,527	1,030	497	67%	33%
Kansas City	152,069	55,533	46,206	9,327	83%	17%
Lake Quivira	54	11	11	-	100%	-
Wyandotte County Totals[6]	**164,345**	**59,983**	**49,783**	**10,200**	**83%**	**17%**

[1] U.S. Census Bureau 2018 5-Year Population and Housing Characteristic Estimates.

[2] Estimates of occupied housing units are provided and utilized in solid waste generation estimates and projections included in this SWMP because waste is not generated from vacant housing units.

[3] Number of occupied single-family and occupied multifamily housing units were estimated based on the overall housing occupancy rate for each city. Overall occupancy rates ranged from 40 – 94 percent by city. Actual occupancy rates for single-family and multifamily housing units may differ from the combined single-family and multifamily occupancy rate.

[4] Distribution represents the total occupied household distribution between occupied single-family homes and occupied multifamily housing units and does not necessarily represent population distribution between household types.

[5] Mobile units, including mobile homes, RVs, vans, boats, etc. are included in multi-family housing unit estimates and account for 2.5 percent of all occupied housing units within Wyandotte County. Mobile units comprise less than five percent of all occupied housing units in each city, except Edwardsville where they comprise 22 percent of all occupied housing units.

[6] Sums may not total exactly due to rounding and mathematical calculations.

Population Distribution by Residential Sector. The estimated total population living in single-family housing units was used to inform the residential solid waste generation projections. The number of occupied housing units informed the population of residents living in single-family and multifamily units based on the U.S. Census Bureau overall average number of people per household.[11] In 2018, an

[10] It should be recognized that while household distribution is useful in estimating population distribution between single-family and multifamily households, it is not equivalent to the population distribution between the two sectors. Single-family households typically have a greater average number of people per household than do multifamily households. For purposes of waste generation forecasting, assumptions were made to estimate population distribution.

[11] This estimate is based on the 2018 overall average persons per household (2.74) calculated from U.S. Census Bureau 2017 5-Year housing and population estimates. Typically, average persons per household is greater for single-family households than multifamily households. To estimate single-family and multifamily population

estimated 86 percent of the County's residents lived in single-family households and an estimated 14 percent lived in multifamily households. Multifamily solid waste generation is included in the commercial projections, provided in Section 3.5. The 2018 estimated single-family and multifamily household and population distributions are shown in Table 3-4.

Table 3-4: 2018 Estimated Single-family and Multifamily Population Distribution

	Occupied Households	Population	Population Percent
Single-Family	49,642	141,182	86%
Multifamily	10,341	23,163	14%
Total	**59,983**	**164,345**	

3.1.2 Population Projections

MARC previously developed the 2040 Forecast to provide estimated number and distribution of population, households and employment by county for the Kansas City region.[12] Burns & McDonnell extrapolated the projection for Wyandotte County to estimate the total population through the end of the 2045 planning period.[13] Population projections indicate that the total Wyandotte County population may grow to approximately 190,800 people in 2045, a total increase of approximately 15 percent from the estimated 2020 population of 164,300.

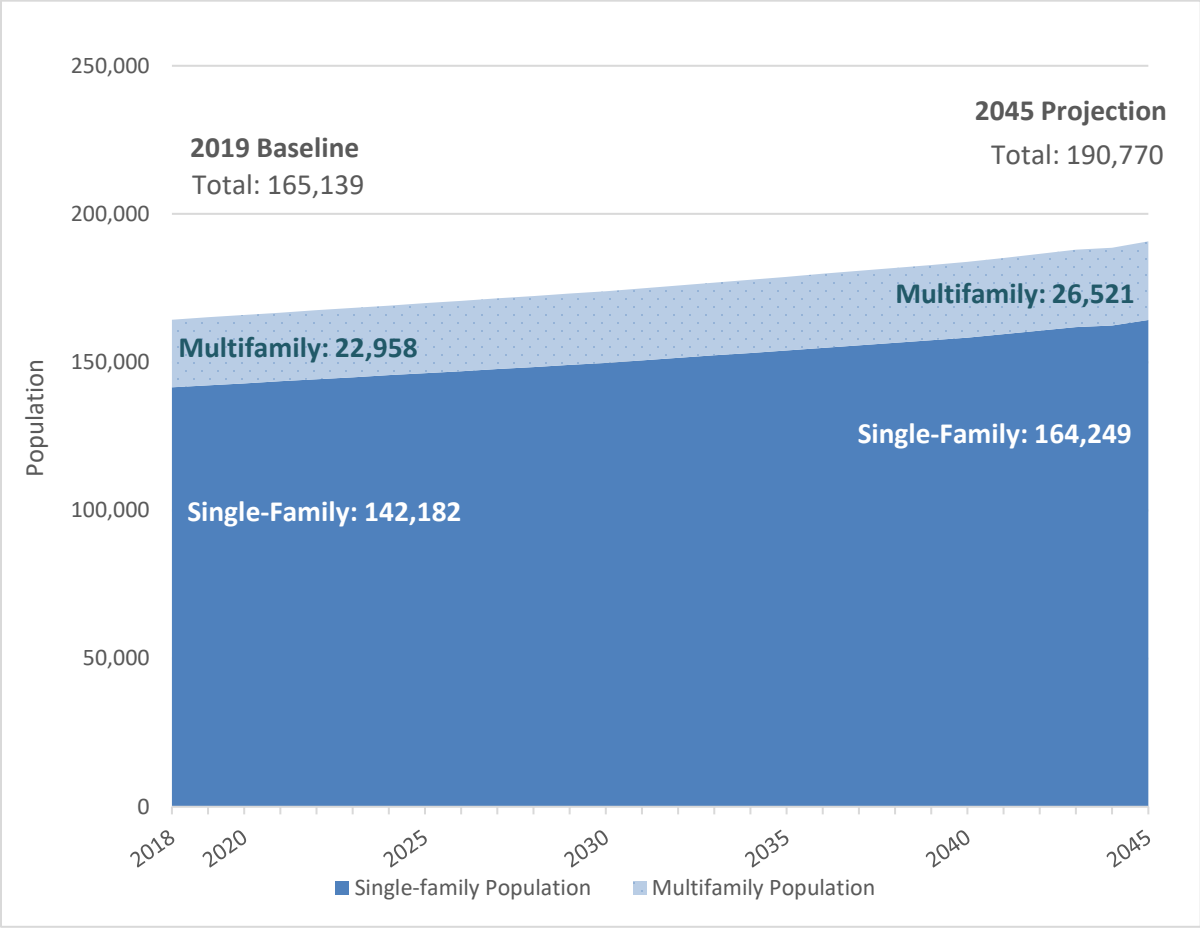
Population growth utilized in projections was based on MARC's total projected County population and single-family and multifamily projected population distribution was based on the respective population distributions presented in Section 3.1.1 and held constant through 2045. Single-family population projections were utilized as the basis for the residential waste generation forecast. Figure 3-2 shows the projected single-family and multifamily population growth of the County over the next 25 years, from 2020 through 2045.

distribution, assumptions of 2.8 persons per single-family household and 2.2 persons per multifamily household were utilized. These assumptions were used to project the waste generation distribution through 2045, presented in Section 3.5.

[12] Source: MARC 2040 Forecast. Population, household, and employment forecasts were based on 2010 Decennial Census data and used to inform the development of Transportation Outlook 2040, metropolitan Kansas City's long-range transportation plan. Retrieved May 2020 from http://www.to2040.org/forecast.aspx

[13] MARC developed the population projections on a 10-year increment basis through 2040 using a 2010 baseline. To estimate population growth for Wyandotte County on an annual basis and extrapolate projections through the end of the 2045 planning period, Burns & McDonnell calculated compound annual growth rates of the ten-year projection intervals and applied the growth rates to the 2018 U.S. Census Bureau 5-year ACS population estimate as a baseline.

Figure 3-2: 2020 – 2045 Wyandotte County Population Projections[1]



[1] U.S. Census Bureau and MARC 2040 Forecast. The 2018 Wyandotte County population estimate based on MARC's 2040 forecast is approximately 163,700. The estimated 2018 population based on the Census Bureau's 5-year ACS estimates is 164,345, a difference of 645 people. Population projections based on U.S. Census Bureau 2018 population and MARC's 2040 Forecast growth rates were used as the basis for the residential solid waste generation forecast to provide conservative estimates (based on per-capita generation rates) and appropriately plan for the potential solid waste quantities the County may need to manage in the future.

3.2 Economic Characteristics

This section describes the County's historic, current, and projected employment levels, utilized as an indicator of economic growth.

3.2.1 Historic and Current Employment

In 2018, the total wage and salary employment within Wyandotte County was approximately 96,500 jobs with approximately 85 percent of employment in the County being private sector (non-farm), followed by

13 percent in State and Local government.[14] The County experienced 10.3 percent total job growth from 2010 to 2018.

Based on the most recent 2016 employment distribution by industry, approximately one in five workers in the County is employed in the health care and social assistance industry (North American Industry Classification System (NAICS) 62). The next largest industries by employment are manufacturing (NAICS 31) with 15 percent of the total workforce, followed by retail trade (NAICS 44) and transportation and warehousing (NAICS 48), each with approximately 11 percent of the total workforce. Wholesale trade (NAICS 42) and accommodation and food services (NAICS 72) each comprise eight to nine percent of the total workforce. The fastest growing industry in the County is professional, scientific, and technical services (NAICS 62) with an average 15 percent annual growth from 2010 – 2016[15].

Table 3-5 provides historic employment growth by industry from 2005 to 2016.

[14] Source: U.S. Bureau of Economic Analysis (BEA), Personal Income and Employment by County and Metropolitan Area, Wyandotte County, Kansas. Retrieved May 2020 from https://apps.bea.gov/itable/index.cfm. BEA estimates are generally higher than those of the U.S. Census Bureau County Business Patterns and the U.S. Bureau of Labor Statistics (BLS), as BEA numbers include employees of private households, government employees (Federal, State, and Local), private schools, and other entities not reporting to BLS (https://www.bea.gov/help/faq/104).

[15] U.S. Census Bureau, 2016 Business Patterns, County Business Patterns (CBP), Wyandotte County, Kansas. Retrieved May 2020 from https://www.census.gov/newsroom/press-releases/2020/county-business-patterns.html; and U.S. Department of Labor, Bureau of Labor Statistics (BLS), Quarterly Census of Employment and Wages. Retrieved May 2020 from https://data.bls.gov/PDQWeb/en CBP and BLS data were used for analysis of industry-specific employment as more detailed data were available.

Table 3-5: Wyandotte County Employment Growth by Industry (2005-2016)[1,2]

Industry	2005	2010	2016	Recent Annual Growth, 2010-2016
Agriculture, forestry, fishing and hunting	N.R.	N.R.	N.R.	N.A.
Mining, quarrying, and oil and gas extraction	0-19	0-19	0-19	N.A.
Utilities	20-99	N.R.	0-19	N.A
Construction	5,143	3,546	4,033	2.3%
Manufacturing	11,887	10,657	10,468	-0.3%
Wholesale trade	5,618	6,057	6,471	1.1%
Retail trade	6,542	7,041	7,981	2.2%
Transportation and warehousing	7,309	7,064	7,556	1.2%
Information	477	250-499	595	N.A.
Finance and insurance	1,137	998	1,109	1.9%
Real estate and rental and leasing	733	702	803	2.4%
Professional, scientific, and technical services	1,413	1,307	2,509	15.3%
Management of companies and enterprises	497	1,221	647	-7.8%
Administrative and support service	2,584	3,545	4,388	4.0%
Educational services	491	503	327	-5.8%
Health care and social assistance	10,302	12,742	14,555	2.4%
Arts, entertainment, and recreation	441	542	486	-1.7%
Accommodation and food services	3,958	4,465	5,662	4.5%
Public administration[3]	1,073	1,456	570	-10.1%
Other services	2,695	2,433	2,618	1.3%
Industries not classified	14	0-19	12	N.A.
Wyandotte County Totals[4]	**62,349**	**64,782**	**70,800**	**1.5%**

[1] Source: U.S. Census Bureau, 2016 Business Patterns, County Business Patterns, Wyandotte, Kansas. Industries are based on 2-digit North American Industry Classification System (NAICS) codes. U.S. Census Bureau data does not include self-employed individuals, employees of private households, or government employees (public administration). Retrieved May 2020 from https://www.census.gov/programs-surveys/cbp/data/tables.html

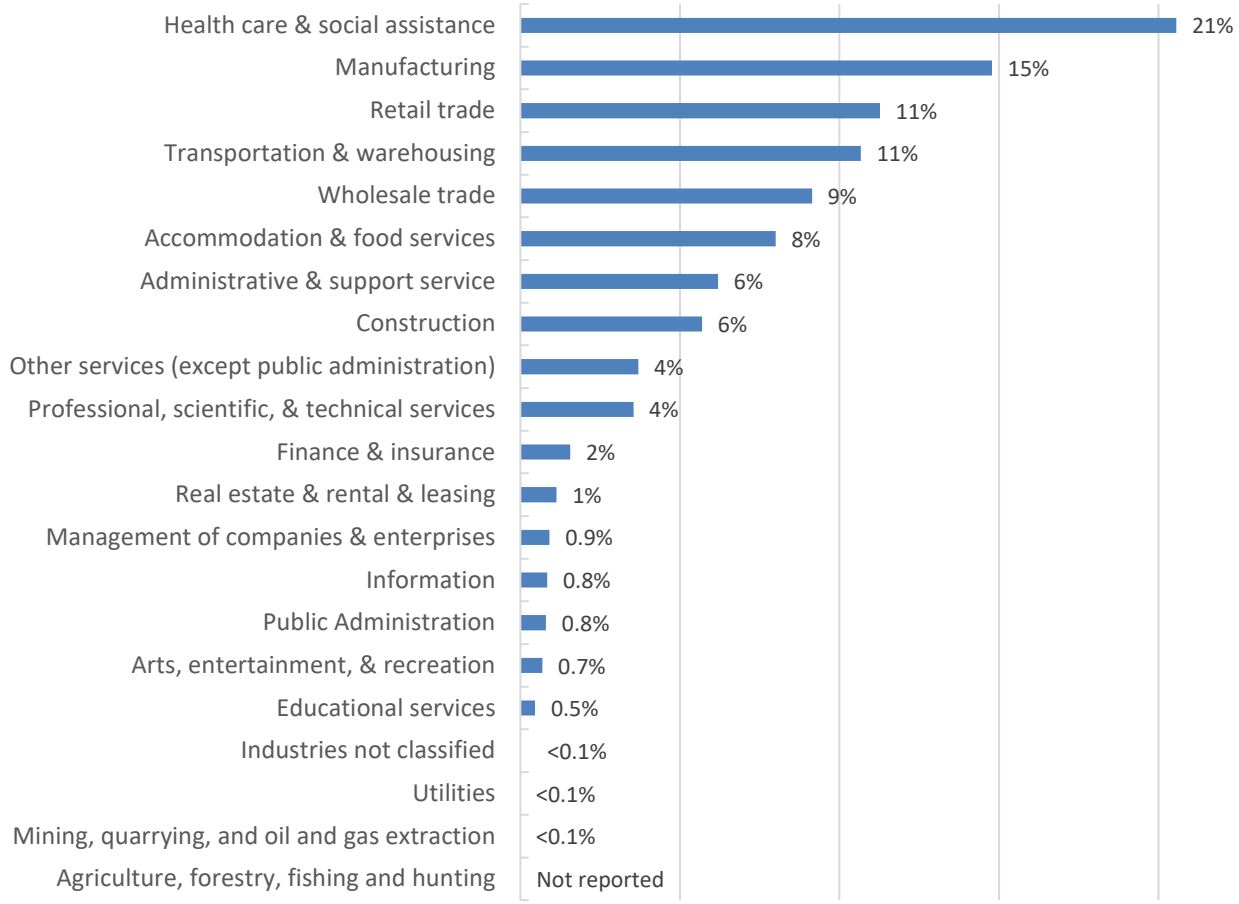
[2] N.R. = not reported. N.A. = not available due to unreported data. In some cases, the U.S. Census Bureau published ranges rather than discrete values to protect respondent confidentiality

[3] Source: U.S. Department of Labor, Bureau of Labor Statistics (BLS), Quarterly Census of Employment and Wages, NAICS code 92, Public Administration. Retrieved May 2020 from https://data.bls.gov/PDQWeb/en

[4] Totals include values withheld by the U.S. Census Bureau to protect respondent confidentiality

Figure 3-3 provides 2016 employment distribution by industry based on available data for the County (Table 3-5).

Figure 3-3: 2016 Wyandotte County Employment Distribution by Industry



Sources: U.S. Census Bureau, 2016 Business Patterns, County Business Patterns, Wyandotte County, Kansas. Retrieved May 2020 from https://www.census.gov/programs-surveys/cbp/data/tables.html; U.S. Department of Labor, Bureau of Labor Statistics (BLS), Quarterly Census of Employment and Wages, NAICS code 92, Public Administration. Retrieved May 2020 from https://data.bls.gov/PDQWeb/en

In 2016, there were approximately 3,000 business establishments within Wyandotte County, a six percent decrease from 2010. When compared with a nine percent increase in the total workforce over the same period, this suggests growth and consolidation of employers within the County.

3.2.2 Employment Projections

Employment projections from the MARC 2040 Forecast were used as the basis for the commercial sector MSW and C&D debris generation forecasts. Burns & McDonnell extrapolated the MARC employment projection for Wyandotte County to estimate the total employment through the end of the 2045 planning

period.[16] Per-employee generation rates for commercial MSW and C&D debris are derived from 2018 baseline employment data from the U.S. Bureau of Economic Analysis (BEA) projected through 2045. County employment may grow to approximately 122,000 employees in 2045, a total increase of 26 percent from the estimated 2018 employment of 96,500.[17]

3.3 Methodology for Current and Forecasted Solid Waste Generation

Understanding current and projected solid waste generation, disposal, and recycling rates allows the County to appropriately plan for the types and quantities of material it will need to manage moving forward. Future solid waste management system requirements, including services, programs, and infrastructure are highly dependent on quantities of material and material type distribution. This section provides an understanding of the methodology utilized to develop current and projected quantities of generated, disposed, and recycled material for the residential and commercial sectors and C&D debris in Wyandotte County.

Current solid waste generation, recycling, and disposal data for the County is presented in Section 3.4. Future solid waste projections are presented in Section 3.5. For definitions of key terms pertaining to sectors, generation, and material types refer Section 1.5.

The following data served as the basis for development of the solid waste generation projections, including MSW and C&D materials, for the County through the end of the SWMP planning period, in the year 2045.

- 2019 population and employment estimates
- 2019 solid waste generation data by sector and material type (presented in Section 3.4)
- Single-family population projections for 2019 - 2045 (presented in Section 3.1.2)
- Employment projections for 2019 – 2045 (presented in 3.2.2)

[16] MARC developed the employment projections on a 10-year increment basis through 2040 using a 2010 baseline. To estimate employment for Wyandotte County on an annual basis and extrapolate projections through the end of the 2045 planning period, Burns & McDonnell calculated compound annual growth rates of the ten-year projection intervals and applied the growth rates to the U.S. Bureau of Economic Analysis (BEA) total wage and salary employment estimate as a 2018 baseline.

[17] Solid waste generation projection methodology is further described in 3.5, U.S. Bureau of Economic Analysis (BEA) estimates for total wage and salary employment are generally higher than those of the U.S. Census Bureau County Business Patterns and the U.S. Bureau of Labor Statistics (BLS), as BEA numbers include employees of private households, government employees (Federal, State, and Local), private schools, and other entities not reporting to BLS (https://www.bea.gov/help/faq/104). MARC 2040 Forecast modeling incorporates BEA estimates. Employment projections based on a BEA 2018 baseline were used for the commercial solid waste generation forecast, to provide conservative estimates based on per-employee generation rates and appropriately plan for the potential solid waste quantities the County will need to manage in the future.

This data was used to develop MSW generation projections for the residential and commercial sectors. As with any long-term planning activity, the development of the MSW generation projections requires a number of assumptions to be made. The developed projections conservatively assume constant per-capita and per-employee waste generation rates and constant recycling rates, based on 2019 estimates. The County may be able to drive decreased waste generation and/or increased recycling rates through its continued programs and initiatives and the recommendations presented in this SWMP. Additional assumptions, data considerations, and limitations are described in the following sections.

3.3.1 Residential Methodology

Current residential MSW generation quantities are primarily based on annual tonnage reports provided by Deffenbaugh Industries doing business as Waste Management, Inc. (Waste Management) for collection contracts in Kansas City, Bonner Springs, and Edwardsville. Hauler reports represent all reported materials collected curbside from single-family residential customers, including refuse and curbside recycling (i.e., paper, plastic, and metal). Additional smaller quantities of material generated by Wyandotte County single-family households, but which are not collected curbside, were obtained from the Unified Government's Recycling & Yard Waste Center, Ripple Glass, and the yard waste drop-off at the Johnson County Landfill. Refer to Section 3.4.1 for a summary of 2019 residential material generation.

Population growth will drive the increase in residential MSW quantities the County will see over the planning period. The 2019 estimated single-family population (refer to Figure 3-2) residing in Wyandotte County and the 2019 residential MSW generation quantities were utilized to estimate average residential sector generation on a per-capita basis for each applicable material. Per-capita material generation estimates were applied to the single-family population projections to develop the total County residential MSW generation forecast through 2045.

When comparing historical and current residential generation data included in this SWMP (refer to Section 3.4.1.1), it should be noted that methodology utilized in estimating residential MSW generation rates may not be consistent between prior versions of the SWMP and this 2020 SWMP update.

3.3.2 Commercial Methodology

Haulers of commercial solid waste are not subject to the same reporting requirements as residential haulers. Commercial hauled tonnage data was not sufficiently available from haulers or facilities receiving this waste to directly estimate commercial MSW tonnages. To address this data gap, Burns & McDonnell reviewed alternate data sources and methods including those used in the 2015 SWMP. This

section describes the data and methodology utilized to develop the commercial MSW forecast, including refuse, recycling, and organics.

Burns & McDonnell reviewed the 2015 SWMP with the intent of utilizing consistent generation estimation methodology, where possible. Consistent with the 2015 SWMP, assumptions for the percentage of commercial and residential MSW generation were used to address the inability to obtain hauler data for commercial MSW. For the 2015 SWMP, commercial MSW generation, recycling, and organics were estimated based on 2007 data for Johnson County, Kansas where "the business sector totaled 48.5 percent of municipal solid waste generated."[18] This 2020 SWMP update uses national-level estimates from the U.S. EPA, and the percentage of MSW from commercial sources was assumed to be 54 percent with the remaining 46 percent from single-family residential sources.[19] Resulting estimates for commercial MSW generation are presented in Section 3.4.1.2. Commercial recycling data was unavailable, and no recycling activity was assumed in this sector to produce a conservatively high estimate for landfill disposal needs.

Projected growth in employment is one approach to estimating the potential economic growth of the County, which will drive the increases in commercial MSW generation the County will see over the planning period. Per-employee commercial generation rates, based on 2019 employment and commercial waste generation estimates as shown in Section 3.4.1.2, were then applied to the MARC employment projections to develop the total County commercial solid waste generation forecast through 2045.[20]

Current and projected commercial generation, processing, and disposal quantities include material generated by multifamily residents within the County. Commercially generated material and material generated by multifamily residents is collected together by commercial haulers. A further breakdown of material by generator type was not available for purposes of developing current and projected generation quantities.[21]

[18] Wyandotte County Solid Waste Management Plan 2015 Five-Year Update (p. 4-4). Prepared by Unified Government of Wyandotte County/Kansas City, Kansas.
[19] U.S. EPA "MSW Residential/Commercial Percentage Allocation – Data Availability" 2013 Memorandum
[20] The use of per-employee factors to estimate commercial MSW is accepted practice and is used by state, local, and corporate entities across the US for planning purposes.
[21] It is estimated that approximately 14 percent of commercial material generation estimates were generated from multifamily sources. This estimate was developed by applying the single-family per-capita generation to the current total estimated multifamily population. The actual multifamily per-capita generation rate may be lower than the single-family per-capita generation rate based on the assumption that multifamily residents generate less material on average because they typically generate less bulk waste and little to no yard waste.

When comparing historical and current commercial generation data included in this SWMP (refer to Section 3.4.1.2), it should be noted that methodology utilized in estimating commercial MSW generation rates may not be consistent between prior versions of the SWMP and this 2020 SWMP update which may exaggerate apparent trends in commercial generation.

3.3.3 C&D Debris Methodology

C&D debris recycling and disposal quantities could not be obtained from haulers or facilities, and estimates were derived based on data and per-employee estimates from Wyandotte County.

The quantities of C&D material generated in Wyandotte County are generally dependent on the level of economic activity and growth, as indicated by the construction and renovation of new residential and commercial properties. Because employment levels are also an indicator of economic growth, the projected employment within the County were used as the basis for C&D debris generation projection. The estimated number of employees in Wyandotte County in 2019 were used with 2018 C&D debris generation rates from Johnson County, Kansas (0.92 ton/employee-year) to estimate C&D debris generation. Per-employee generation rates were then applied to the MARC employment projections to develop the total County C&D debris generation forecast through 2045. As discussed in Section 3.2.2, employment projections based on BEA estimates (such as those form MARC) are generally higher than employment estimates from the (Bureau of Labor Statistics) BLS. As a result, C&D estimates based on per-employee generation rates can be considered conservative high-end figures to appropriately plan for the potential solid waste quantities the County will need to manage in the future.

3.4 Current Solid Waste Generation, Recycling, and Disposal

In 2019, an estimated total of approximately 227,100 tons of solid waste were generated in Wyandotte County, including 136,800 tons of MSW (residential and commercial) and 90,300 tons of C&D debris. Commercial recycling data was unavailable, and no recycling activity was assumed in this sector to produce a conservative projection for landfill disposal needs. Of the total estimated waste generation in Wyandotte County, 2 percent of material was recycled through residential and drop-off recycling programs, including 3,100 tons of traditional recyclables (i.e., paper, plastic, metals, and glass), 500 tons of organics and 50 tons of HHW and electronics. Figure 3-4 illustrates distribution of the County's current solid waste generation by sector and material type.

Figure 3-4: Current Solid Waste Generation by Sector and Management, Wyandotte County

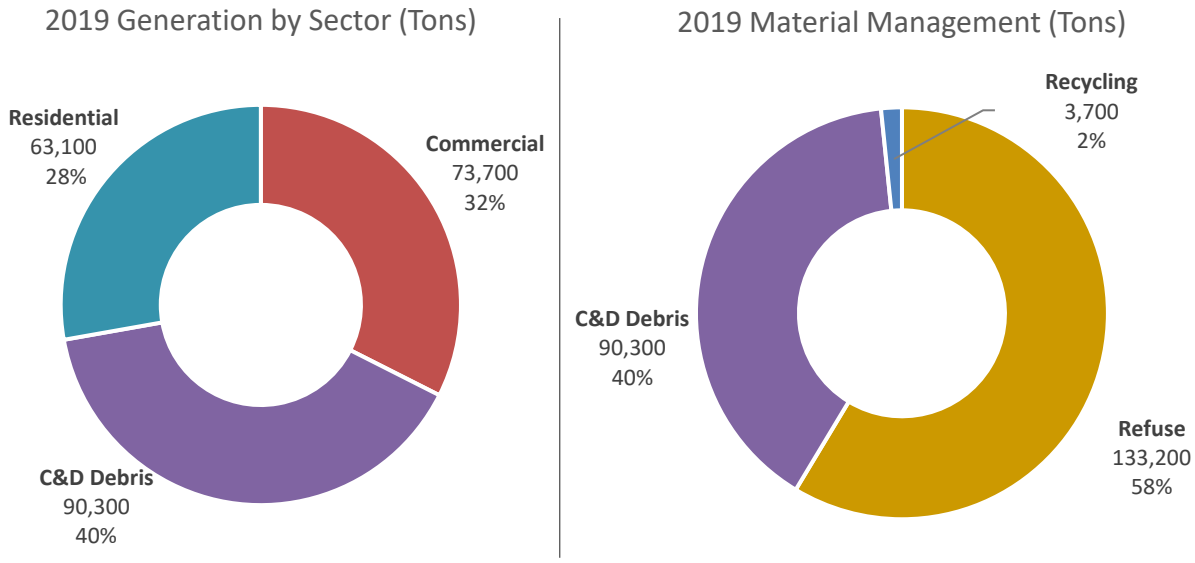


Table 3-6 provides a summary of 2019 total annual generation and per-capita generation for the residential sector, commercial sector, and C&D debris. The generation data presented in Table 3-6 serves as the basis for projections in the waste generation forecast presented in Section 3.5.1.

Table 3-6: 2019 Solid Waste Generation: Residential, Commercial, C&D Debris

Sector	Total Generation (Tons)	Total Population/ Employment[1]	Annual Generation Per Person/Employee[2]
Residential[1]	63,100	142,182	887
Commercial	73,700	97,715	1,509
Total MSW Generation	136,800		
C&D Debris	90,300	97,715	1,847
Total Solid Waste Generation	**227,100**		

[1] Residential total generation reflects the quantity of material generated by residents of single-family homes and total population reflects the total population residing in single-family homes within the County. Material generated by residents in multifamily homes is included in the commercial total generation.

[2] C&D debris generation rates are from Johnson County, Kansas and were used to estimate C&D generation for Wyandotte County.

Table 3-7 provides a detailed understanding of current solid waste generation by sector and material type and provides each sector-specific recycling rate. The following sections provide further information regarding the generation, disposal, and recycling quantities in the residential and commercial sectors (Section 3.4.1) and for C&D debris (Section 3.4.2).

Table 3-7: Detailed 2019 Solid Waste Generation, by Sector and Material Type

Sector	Residential	Commercial[1]	C&D Debris[2]	Totals
Disposal				
Refuse	59,408	73,700		**133,100**
C&D debris			90,250	**90,220**
Total Disposal	**59,408**	**73,700**	**90,250**	**223,400**
Recycling				
Recyclables	3,074	-[3]		**3,074**
Organics	535	-[3]		**535**
HHW and E-waste	56			**56**
C&D debris			50	**50**
Total Recycling	**3,665**	-[3]	**50**	**3,700**
Total Generation	63,073	73,700	90,300	227,100
Recycling Rate	5.8%	-	0.1%	1.6%

[1] Commercial recycling data was unavailable, and no recycling activity was assumed in this sector to produce a conservative estimate of overall diversion activity.

[2] Estimated based on per-employee generation and disposal rates for Johnson County and 2019 employment for Wyandotte County from the U.S. Bureau of Economic Analysis.

[3] Commercial recycling data was unavailable, and no recycling activity was assumed in this sector to produce a conservatively high estimate for landfill disposal needs.

3.4.1 MSW Generation, Recycling, and Disposal

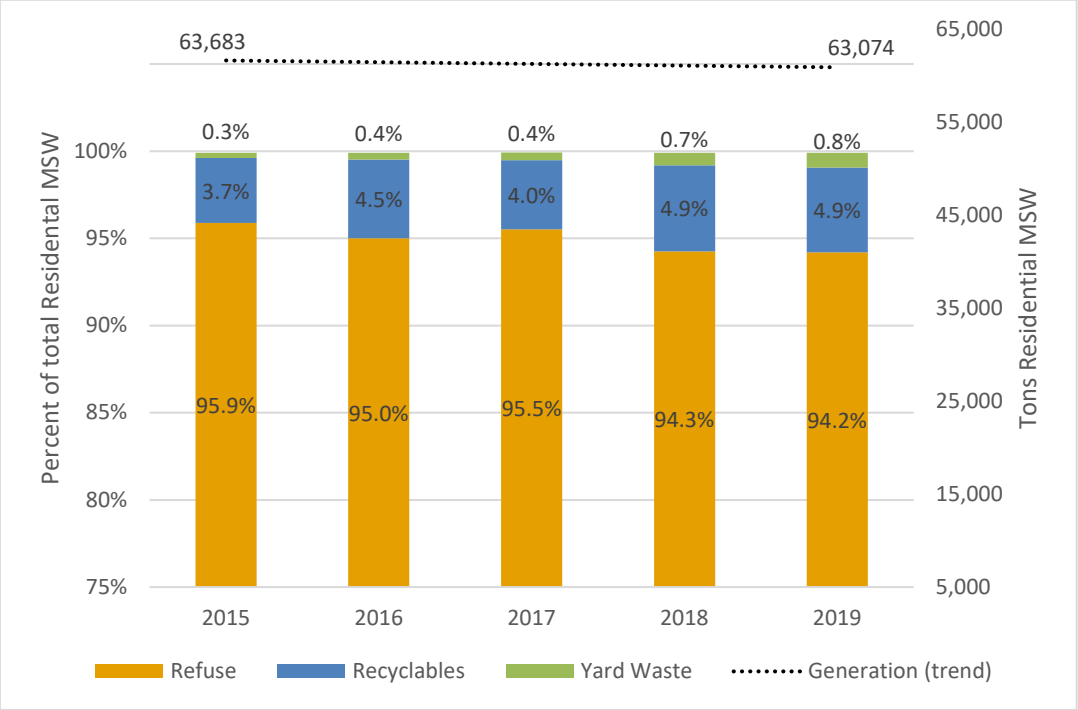
In 2019, a total of approximately 136,800 tons of MSW was generated by the residential and commercial sectors within Wyandotte County. MSW includes all refuse, recyclables, organics (yard waste and food waste), HHW and e-waste generated.

3.4.1.1 Residential MSW

Residential Generation: In 2019, Wyandotte County's residential sector generated a total of approximately 63,100 tons of MSW, equating to a total of 887 pounds of MSW per capita annually. Approximately 94 percent of residential MSW is disposed in landfills, with four percent recycled through curbside programs, two percent recycled through drop-off (recycling and yard waste), and small quantities (less than one percent) recycled through HHW and e-waste programs. Figure 3-5 shows the trends in generation and management of residential MSW from 2015 to 2019. Residential MSW generation was relatively flat over this period, decreasing less than one percent from approximately 63,700 tons in 2015 to 63,100 tons in 2019. Residential generation in the County follows the longer-term

national trend, where per-capita MSW generation rates have remained relatively flat and changes in waste generation are driven primarily by increases or decreases in population.[22]

Figure 3-5: Residential MSW Generation Trends, 2015-2019[1,2]



[1] Data primarily from the Wyandotte County Solid Waste Committee 2020 Annual Meeting, with supplemental facility data (e.g., Ripple Glass).
[2] Small quantities of HHW and e-waste (less than one percent of total generation for each year) are not reflected in the Figure.

Residential Recycling. As shown in Figure 3-5, recovery of the residential MSW stream has increased since 2015. As discussed in Section 2.4, Solid Waste Management Industry Trends, there are various factors and methods for increasing recycling and yard waste diversion.

On average, each resident of Wyandotte County (living in a single-family home) generates a total of 887 pounds of residential MSW per year. This includes 835 pounds of material disposed in landfills and 52 pounds of material recycled through curbside collection and drop-off programs. Based on 2019 data, the County's residential recycling rate is 5.8 percent, including HHW and e-waste. Table 3-8**E** provides a breakdown of the current residential disposal and recycling quantities on at a total and per-capita basis.

[22] Based on national data from the U.S. EPA, total per-capita MSW generation has been relatively flat since the mid-1990s < https://www.epa.gov/sites/production/files/2020-11/documents/2018_ff_fact_sheet.pdf>

Table 3-8: 2019 Residential MSW Generation

MSW Type	Total Tons	Pounds per Capita	Percentage
Disposal			
Refuse	59,408	836	94%
Recycling[1]			
Recyclables	3,074	43	4.9%
Yard Waste	535	7.5	0.8%
HHW	44	0.6	0.1%
E-waste	12	0.2	<0.1%
Total Recycling	**3,665**	**52**	**5.8%**
Total Generation	**63,073**	**887**	

[1.] Sum of values may not equal total due to rounding

In 2019, the residential MSW recycling rate was 5.8 percent. Traditional recyclables (i.e., paper, plastic, metal, and glass) comprised the majority of recycling activity at 4.9 percentage points, while yard waste, HHW and e-waste recycling comprised less than one percentage point each.

Residential MSW generation and recycling is often communicated on a per-capita basis. This information has been communicated on a per-capita basis in Table 3-8**.** to maintain consistency with the County's prior SWMP. Measuring residential generation and recycling on a per-household basis is another common metric utilized in many solid waste studies and planning efforts. Section 3.5.1 provides program performance information for the Unified Government curbside collection contract on a per-household basis.

Table 3-9 shows further detail in residential disposal and recycling trends in the County from 2015-2019. The overall recycling rate has increased since 2015, from 4.1 percent to 5.8 percent.

Table 3-9: Residential MSW Recycling Trends, 2015-2019[1]

MSW Type	2015		2016		2017		2018		2019	
	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent	Tons	Percent
Disposal										
Refuse	61,050	96%	55,782	95%	59,912	96%	54,758	94%	59,408	94%
Recycling										
Recyclables	2,373	3.7%	2,653	4.5%	2,495	4.0%	2,867	4.9%	3,074	4.9%
Yard Waste	190	0.3%	232	0.4%	271	0.4%	409	0.7%	535	0.8%
HHW	39	0.1%	36	0.1%	34	0.1%	47	0.1%	44	0.1%
E-waste	21	<0.1%	19	<0.1%	16	<0.1%	12	<0.1%	12	<0.1%
Recycling Rate	**4.1%**		**5.0%**		**4.4%**		**5.6%**		**5.8%**	

[1] Sources: Data primarily from the Wyandotte County Solid Waste Committee 2020 Annual Meeting, with supplemental drop-off facility data (e.g., Ripple Glass). Recycling data for 2017-2019 includes estimated annual quantities for the Recycling and Yard Waste Center based on provided car counts.

Since 2015, yard waste recycling has increased within the County with reported drop-off tonnages nearly tripling. Increased recycling may also reflect expanded curbside recycling access. The Edwardsville curbside recycling program began in April 2016, expanding curbside recycling access within the County. Through the end of 2019, the program has recovered a total of 536 tons of curbside recycling.[23]

HHW recycling quantities included in Table 3-9**Error! Reference source not found.** capture material collected through Saturday collection events in Wyandotte County. E-waste quantities in Table 3-9**Error! Reference source not found.** reflect two electronics recycling events held in the County. Other recycling and diversion activity may exist in the County, but quantities are unknown.

Various charitable entities, such as Goodwill, the Salvation Army, and religious institutions within the County accept clothing and household items for donation and reuse, which would otherwise be disposed in landfills with residential refuse. The quantities of residential reuse materials are unknown but are likely currently a small proportion of total MSW generation. Further discussion regarding residential recycling activities, material quantities, and potential strategies are presented in Section 6.0, Residential Recycling.

[23] Wyandotte County Solid Waste Committee 2020 Annual Meeting

3.4.1.2 Commercial MSW

Commercial Generation and Recycling: Wyandotte County's commercial sector generated an estimated 73,700 tons of MSW in 2019, based on an estimated 54 percent of MSW coming from the commercial sector as described in Section 3.3.2.[24]

3.4.2 Construction and Demolition Debris

C&D Debris Generation and Recycling. Using employment-based estimates described in Section 3.3.3, Wyandotte County generated an estimated 90,254 tons of C&D debris in 2019. Recycling of C&D debris is a challenge, due to factors such as the comingled nature of material generated by projects, special collection or hauling needs, and specialized equipment required to separate or process materials. Available data on quantities of recycled C&D debris are limited, and nearly all material is assumed to be disposed in landfills. Current C&D recycling efforts are described in Section 10.0, Construction and Demolition.

3.5 Projected Solid Waste Generation, Recycling, and Disposal

Utilizing the methodology and data described herein, Burns & McDonnell developed a forecast of the County's solid waste generation over the 25-year planning period (2020 – 2045). Per-capita and per-employee material generation rates were assumed to remain constant through the duration of the planning period to provide conservative total quantity estimates for management purposes. Recycling rates were also assumed to remain constant. The County could see decreased per-capita and per-employee generation rates and/or increased recycling rates if continued solid waste reduction and recycling initiatives are impactful.[25]

Figure 3-6**Error! Reference source not found.** presents the projected solid waste generation for the residential, commercial, and C&D sectors through 2045, based on current generation levels and population and employment projections.

[24] An estimated 14 percent of commercial MSW was generated by multifamily households.
[25] There is potential for decreased per-capita and per-employee generation and decreased rate of material generation growth. However, the County is projected to see significant growth in population and employment and it is therefore unlikely that total generation quantities would decrease in the future.

Figure 3-6: 2018-2045 Wyandotte County Solid Waste Generation Forecast by Sector (Tons)

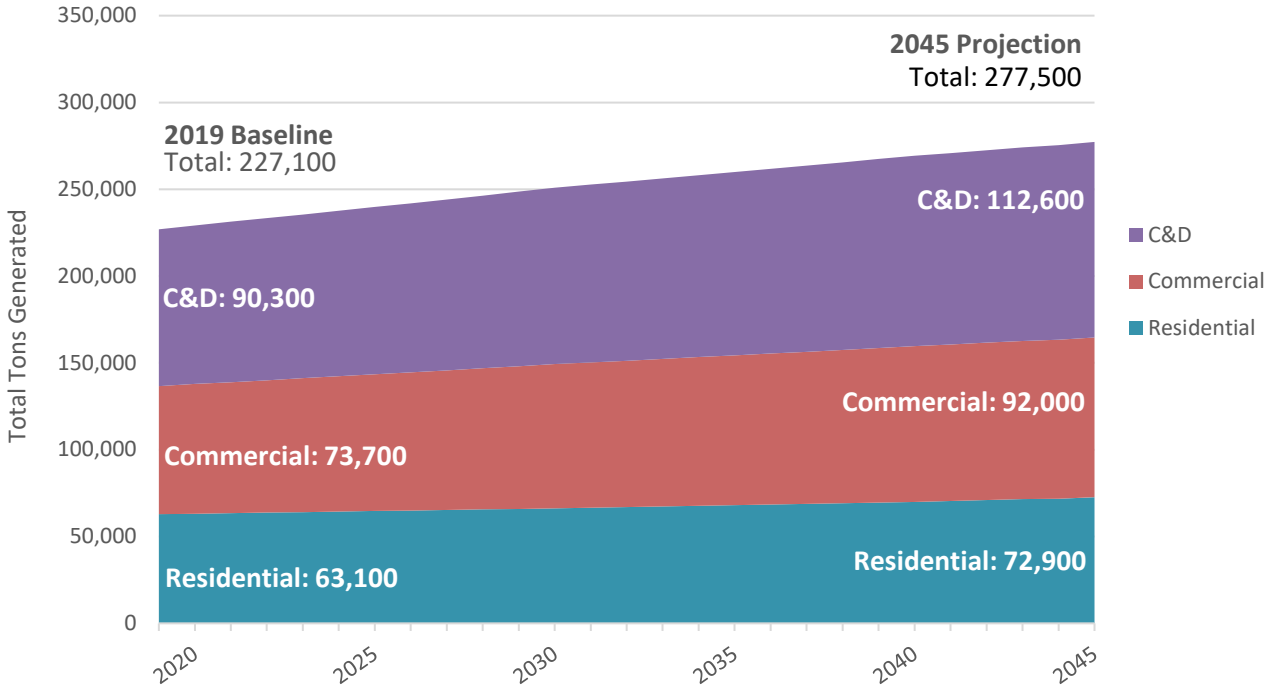


Table 3-10**Error! Reference source not found.** provides further detailed projections, presenting the estimated quantities of solid waste that may be disposed and recycled at a series of points during the 25-year period. This table summarizes the scenario where the current levels of solid waste generation and recycling rates (per resident and per employee) are maintained. Total disposal includes refuse and C&D debris. Total generation includes all material that is recovered through various recycling activities (e.g., curbside recycling, yard waste drop-off) and estimates increase in relation to projected increases in population and employment.

Table 3-10: 2019-2045 Wyandotte County Solid Waste Generation Forecast (Tons)

	2019	2025	2035	2045
Total				
Residential[1]	63,100	64,900	68,300	72,800
Commercial	73,700	78,700	86,300	92,000
C&D	90,300	96,400	105,600	112,600
Total Generation	**227,100**	**240,000**	**260,200**	**277,500**

[1] Residential disposal and recycling values for 2019 reflect estimates based on reported quantities in the Wyandotte County Solid Waste Committee 2020 Annual Meeting, and supplemental facility data (e.g., Ripple Glass). All other quantities are forecasts based on the methodology described in Section 3.5

3.5.1 Residential MSW Projections for the Unified Government Contract

Residential MSW generated within Kansas City, KS and Bonner Springs is collected curbside under a single collection contract with Waste Management. Under this contract, refuse and recycling collection is provided to single-family homes up to a four-plex. In 2019, an estimated 61,400 tons of residential MSW was generated within the collection contract area, equivalent to 2,500 pounds per single-family household. Of this, 2,136 tons of traditional recyclables (i.e., paper, plastic, and metal) were collected curbside in 2019, equivalent to 88 pounds per single-family household.

Approximately 97 percent of residential MSW generated in Wyandotte County is from residents in the contract service area (i.e., Kansas City, KS and Bonner Springs). Due to the large portion of the County that is covered by the Unified Government collection contract, efforts to increase recycling in the Unified Government contract area will drive overall performance of the County's recycling efforts.

3.6 Waste Characterization

Waste characterization is the analysis of the composition of a waste stream on a detailed level. A waste characterization study includes sorting refuse material into material types to identify the amounts of paper, glass, plastic, food waste, etc. that make up the material that is disposed in landfills. This information is valuable in identifying and targeting material types or other challenges for future planning efforts and informing the development of recycling programs and educational campaigns. Waste characterization results can give an understanding of the types and quantities of recyclable materials that are currently being disposed in landfills, and therefore the potential for increased material recovery and increased recycling rates.

Composition of MSW material disposed in landfills (including recyclable and non-recyclable material) varies from region to region based on many factors, such as ratio of residential to commercial sectors,

access to recycling programs, and vegetative growth. The materials that are currently disposed include both recyclable and non-recyclable materials, but the proportions of material that could potentially be recycled versus material that would continue to be disposed are not known. It is important to recognize that there are challenges to capturing all material that seemingly has the potential to be recycled. Even if a material has the potential to be recycled or diverted, it may be impractical from a cost and/or environmental perspective for all material to be recycled due to factors such as:

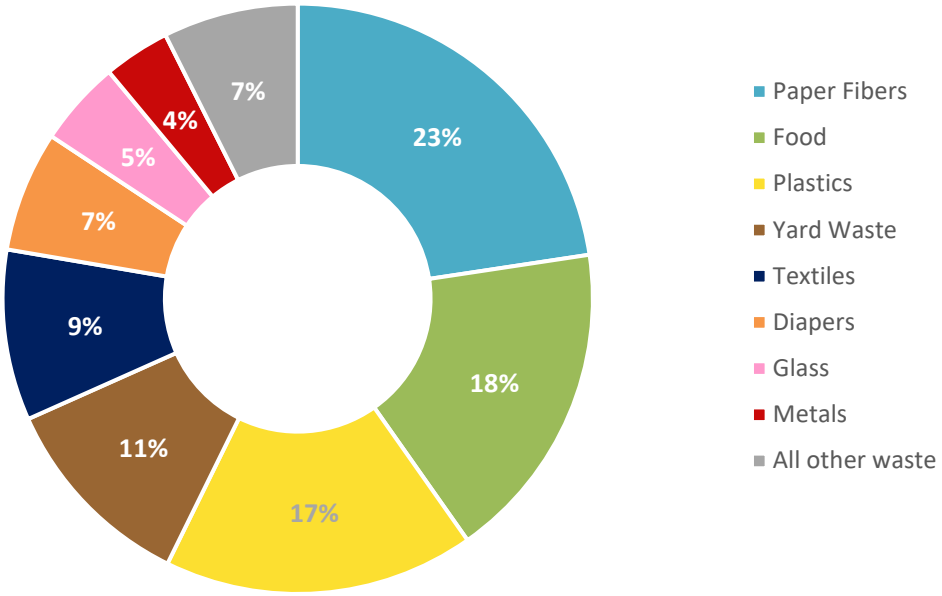
- Lack of recycling infrastructure;
- Contamination of recyclable materials;
- Access to end markets; and
- Need for additional public education and outreach.

In 2015 and 2016 the Johnson County Department of Health and Environment (JCDHE) commissioned a series of waste characterization studies at three of Johnson County's largest waste disposal and management facilities including Johnson County Landfill, the City of Olathe Transfer Station, and the Hamm Olathe C&D Debris Landfill.[26] The study included analysis of MSW loads generated within Wyandotte County and disposed at Johnson County facilities. This section presents the results of these waste characterizations for MSW material generated in Wyandotte County by sector (residential and commercial) based on detailed material type distribution data.

Residential Waste Characterization. Figure 3-7 presents the residential waste characterization for Wyandotte County. Paper fibers (23 percent) and food waste (18 percent) are the two most abundant material types, together comprising approximately 40 percent of all residential MSW disposed in landfills. Plastics account for another 17 percent of disposed residential MSW. Yard waste is the next prominent component, at 11 percent of landfilled residential MSW.

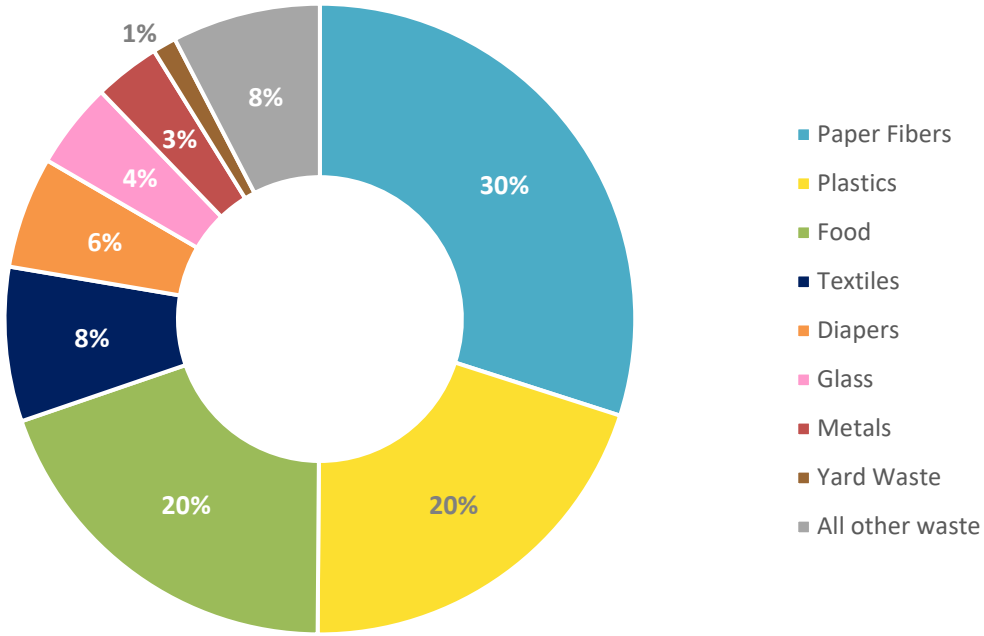
[26] Johnson County Solid Waste Characterization Study, September 30, 2016. Prepared by Engineering Solutions & Design, Inc. Available online at https://www.jocogov.org/dept/health-and-environment/environment/solid-waste/sw-mgmt-plan

Figure 3-7: Residential MSW Waste Characterization, Wyandotte County



Commercial Waste Characterization. Figure 3-8 presents the commercial waste characterization for Wyandotte County. The three most abundant types of disposed commercial MSW are the same as for residential MSW, with paper fibers comprising 30 percent of the stream followed by food waste and plastics each making up 20 percent. The high percentage of paper fibers can likely be attributed to the large volumes of cardboard and office paper generated by many businesses.

Figure 3-8: Commercial MSW Waste Characterization, Wyandotte County



4.0 FACILITIES

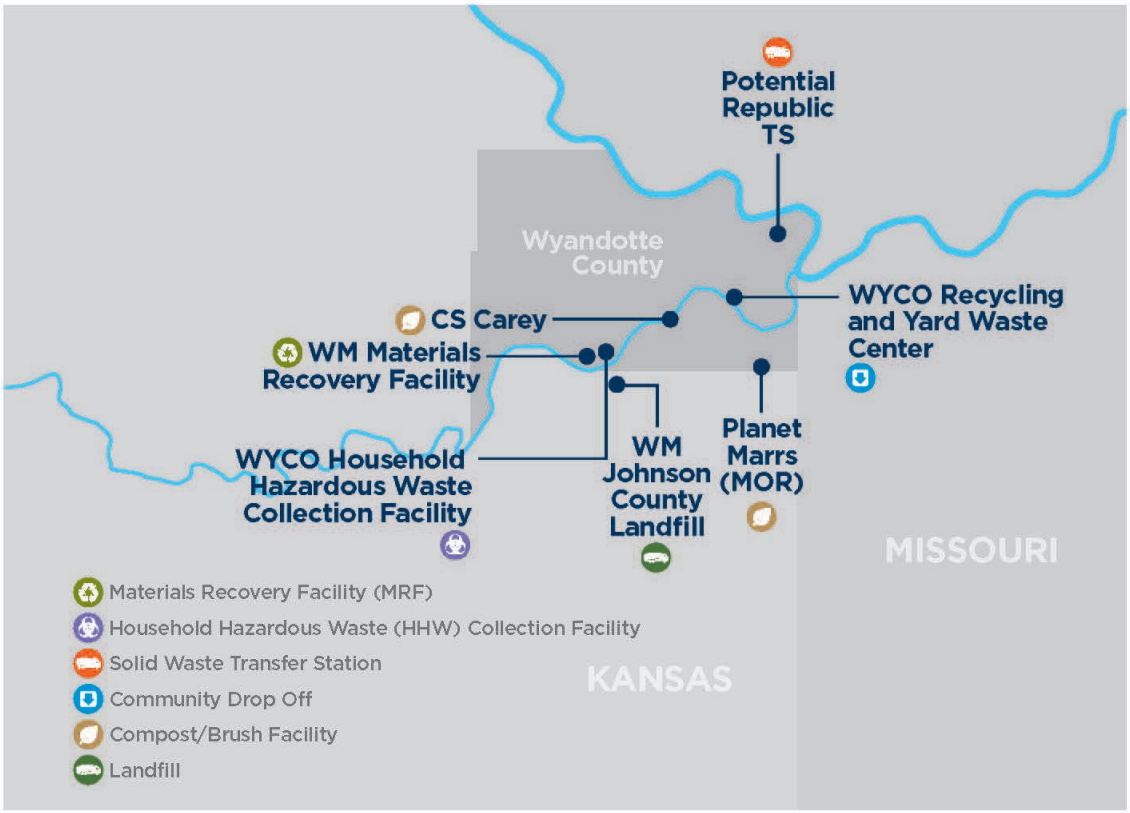
Consideration of solid waste processing and disposal facilities on both a regional and local level is essential for the future of MSW management for the County. The availability of local processing and disposal facilities will impact many of the decisions the County makes regarding MSW management and the structure in which residents and commercial establishments are providing solid waste services and the timing for implementation of various recommendations.

4.1 Current System Review

This section provides an overview of existing MSW processing and disposal facilities located within the County and the surrounding region, including landfills, MRFs, transfer stations, organics processing facilities, and HHW processing facilities.

Figure 4-1 identifies locations of solid waste facilities in and around Wyandotte County. Additional regional facilities and their remaining life are discussed within this section.

Figure 4-1: Solid Waste Facilities in and around Wyandotte County



4.1.1 Landfills

Landfill capacity is a finite resource in the region and permitting new landfills is becoming increasingly difficult (as discussed in the Landfill Trends portion of Section 2.3). Increasing recycling and organic material diversion would serve to ease the constraint of disposal capacity in the future. This section provides an overview of regional landfill facilities, quantities and types of materials disposed, and provides an estimate of when landfills may reach capacity.

MSW Landfills. There are currently no operational Subtitle-D (permitted to accept MSW) landfills within Wyandotte County. Forest View Landfill was closed in December 2006; post-closure monitoring is ongoing. Waste Management's Johnson County Landfill is located adjacent to the County and is currently utilized for the disposal of residential waste. There are also other regional Subtitle-D landfills which currently accept or could potentially accept MSW from the County. Table 4-1 identifies the Subtitle-D landfills currently in operation in the region and provides disposal and remaining capacity data. The Lee's Summit Resource Recovery Park ceased acceptance of MSW in April of 2019 and will begin final closure.[27]

Table 4-1: Regional Subtitle-D Landfill Disposal and Remaining Capacities

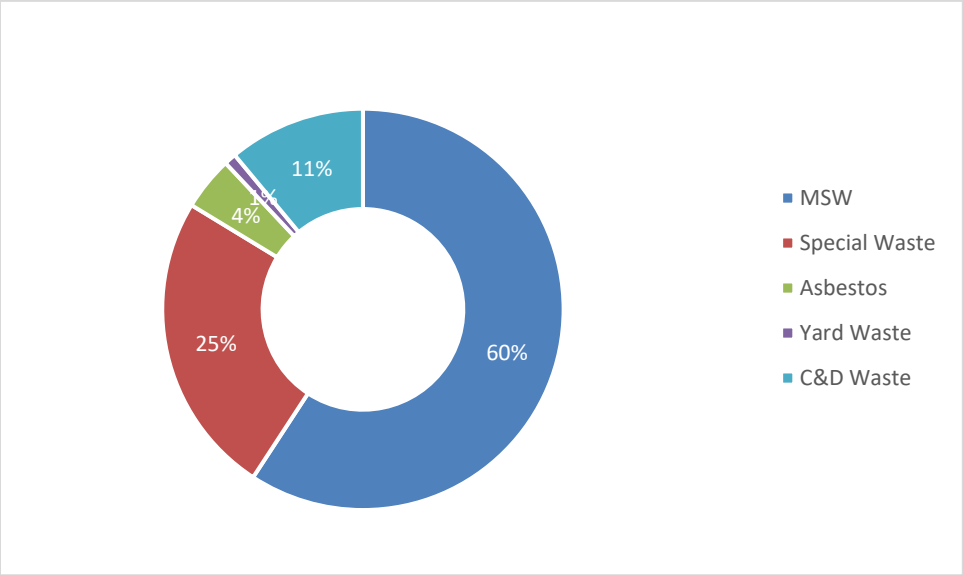
State	County	Permit Holder/Site Name	Annual Waste Accepted[28] (Tons)	Estimated Remaining Life (Years)
KS	Johnson	Johnson County (Waste Management)	1,550,240	>20
KS	Jefferson	Hamm Landfill	397,215	>80
KS	Shawnee	Rolling Meadows (Waste Management)	260,506	>40
MO	Pettis	Central Missouri Landfill (WCA)	773,221	<10
MO	Jackson	Sugar Creek Landfill (Courtney Ridge/Republic Services)	984,851	>30
MO	Buchanan	St. Joseph Landfill	241,004	>20
MO	Johnson	Show-me Regional Landfill (Allied/Republic)	155,258	>30

Johnson County Landfill. The Johnson County Landfill privately owned and operated by Waste Management is the primary disposal location for residential solid waste generated in Wyandotte County.

[27] https://www.kshb.com/news/local-news/lees-summit-landfill-closes-after-reaching-trash-capacity
[28] 2019 data based on KDHE and MDNR publicly available annual tonnage reports.

The 850-acre property includes 500 acres permitted for waste disposal of MSW and C&D waste. Figure 4-2 depicts the disposal composition at the Johnson County Landfill from 2019.

Figure 4-2: 2019 Disposal Composition at Johnson County Landfill[29]



Quantities of materials disposed at the Johnson County Landfill are reported to KDHE and are summarized in Table 4-2.

Table 4-2: Solid Waste Disposed of at the Johnson County Landfill Annually (Tons)[30]

Year	MSW	Special Waste	Asbestos	Yard Waste[1]	C&D Waste	Total
2019	932,287	385,281	67,801	15,174	173,733	1,565,276
2018	918,063	263,921	12,801	14,312	77,951	1,287,048
2017	990,956	273,102	3,363	18,892	16,902	1,303,215
2016	1,030,916	307,203	2,598	21,810	1,030,916	1,377,677
2015	1,069,458	237,775	4,435	25,927	25,295	1,362,890
2014	1,087,941	244,162	8,013	23,976	30,803	1,394,895

1. Yard waste is taken to the compost facility at the landfill.

Based on KDHE Tonnage Reports for 2019, 59 percent of waste disposed of at the landfill is generated in Kansas and 41 percent of waste disposed of at the landfill is generated in Missouri. Insignificant amounts of waste have been authorized for disposal at the landfill from neighboring states of Nebraska, Iowa, and

[29] Landfill disposal composition provided by Waste Management to KDHE, 2019.
[30] Solid waste disposal quantities provided by Waste Management to KDHE, 2018.

Oklahoma, as needed. The current tipping fee for the Johnson County Landfill is $77.20 for a pickup truck or $60.65 per ton with premiums added on the weekend.

C&D Landfills. There are no active, permitted C&D landfills in Wyandotte County. All material generated within the County is hauled out of county for disposal. Table 4-3 identifies the C&D landfills currently in operation in the region and provides disposal and remaining capacity data.

Table 4-3: C&D Landfill Overview[31]

Facility	Annual Tonnage					Estimated Remaining Life[32]	Tipping Fee
	2014	2015	2016	2017	2018		
Hamm Olathe C&D Landfill (Johnson County, KS)	100,233	54,813	67,487	0	56,169	0[33]	Pickup truck - $180 Trailer 10' or less w/ 4" sideboards- $250 Trailer 16' or less w/ 4" sideboards- $270
APAC-Stanley C&D Landfill (Johnson County, KS)	104,476	104,661	105,138	141,542	127,441	8	Pickup truck - $70 + $5/ton Single axle trailer - $250 + $1/ton Double axle trailer - $300 + $1/ton
Lone Elm C&D Landfill (Johnson County, KS)	85,656	46,818	0	0	0	n/a	n/a
Asphalt Sales Company Landfill (Johnson County, KS)	106,862	88,490	146,011	97,642	89,435	7	Pickup truck - $180 + $1/ton Single axle trailer - $250 + $1/ton Double axle trailer - $300 + $1/ton
Pink Hill Acres (Jackson County, MO)		50000	50000	50000	50,000	15	
Flat Land Excavation LLC (Leavenworth County, KS)		1,892	4,259	3,122	6,926		

4.1.2 Material Recovery Facilities (MRF)

Table 4-4 identifies the regional MRFs utilized. Some facilities operate in a manner typical of large MRFs, using a combination of large processing equipment and manual labor to sort and process

[31] Data provided by KDHE Solid Waste Database Tonnage Reports, 2018, facilities, and City of Olathe Long-Term Solid Waste Master Plan, 2018.
[32] Data obtained by permit holders.
[33] Current cell anticipated to reach capacity in Fall 2019. Hamm is currently in the process of permitting and designing another cell with a 2-3 year capacity. Additional capacity for 8-10 years is available, but not currently permitted.

recyclable materials, and accept the typical range of materials seen in most single-stream recycling programs while other facilities focus on specific materials such as paper and cardboard. Generally, they accept material from both commercial and municipal collection and hauling operations, from residential and commercial sources.

Table 4-4: Local Materials Recovery Facilities (MRFs)

Site Name	County	State
Waste Management Recycle America	Wyandotte	KS
MARCK Industries	Johnson	KS
Hamm Material Recovery Facility	Jefferson	KS
Midwest Shredding	Jackson	MO
Manchester Transfer - WCA	Jackson	MO
Material Recovery and Transfer LLC	Jackson	MO

The recyclable materials collected from the County's residential recycling programs are processed at the largest MRF in the metropolitan area, Waste Management Recycle America Facility in Kansas City, Kansas. In 2018, Waste Management processed 87,627 tons of recyclables at this facility. It currently has the capacity to process 120,000 tons annually.[34]

4.1.3 Transfer Stations

There are no operational transfer stations within Wyandotte County; however, the role of transfer stations may grow as regional landfill capacity decreases.

Republic Transfer Station. Early in 2020, Browning-Ferris Industries (Allied Services, Republic Services) submitted a special use permit to the Unified Government to operate a transfer station at 3150 N 7th Street Trafficway in Kansas City, Kansas. At the time of Plan submission, Republic has delayed the reopening of this facility indefinitely. This facility previously operated as a transfer station, but has been closed for over 20 years. It is currently used for solid waste collection fleet maintenance and storage for dumpsters and roll-off containers. It would undergo significant site improvements prior to reopening to meet current regulatory standards. It is estimated that this transfer station would accept approximately 1,000 tons of material per day that is generated within 10 miles of the facility.

[34] Data provided by Waste Management, 2019.

4.1.4 Organics Processing Facilities

There are two permitted yard waste composting facilities located in Wyandotte County – Woodland Lawn and Planet Marrs Recycling. Additionally, there are regional composting facilities to serve Wyandotte County.

Woodland Lawn and Tree, Inc. Woodland Lawn and Tree, Inc. is a landscaping company and their composting facility exclusively handles material generated through their business operations.

Planet Marrs Recycling. Planet Marrs Recycling has leased their property to Missouri Organic Recycling. This composting facility is open to the public to drop off yard waste material for a fee. Products may also be purchased from this location.

CS Carey, Inc. CS Carey, Inc. is a land-clearing and mulching company that operates a mulching facility in Wyandotte County. Ground mulch material is processed and available for purchase. Permits are not required for this type of facility.

Johnson County Landfill. Waste Management operates a permitted composting facility located within the boundaries of the Johnson County Landfill. Materials received at this location include yard trimmings and tree brush. The materials are primarily generated from residential haul routes in Johnson County as well as material from regional commercial landscaping companies and residential drop off through their customer convenience center. Quantities of materials accepted at the composting facility at Johnson County Landfill are provide in Section 4.1.1.

Missouri Organic Recycling. Missouri Organic Recycling, located in Kansas City, Missouri, is the only regional facility permitted to accept and compost food waste in addition to yard waste. They currently compost over 15,000 tons of food waste each year, collected from commercial entities, along with yard waste provided by the City of Kansas City, Missouri, residential drop-off locations, and other suppliers. Missouri Organic Recycling produces approximately 40,000 cubic yards per year of basic and enhanced compost at its Liberty, Missouri compost facility. Approximately 400,000 cubic yards of wood material is ground, colored, and sold as mulch per year.[35]

4.1.5 Household Hazardous Waste and Other Special Waste Facilities

Household Hazardous Waste. The Unified Government owns and operates the Household Hazardous Waste Collection Facility at 2443 S. 88th Street. There are no specified limits of material quantities a

[35] Quantities provided by Missouri Organic Recycling, 2019.

resident may drop off, but all waste must be of residential origin. Home business, small business, commercial, and industrial wastes are not accepted. Quantities of materials collected and managed at the facility is shown on Table 4-5.

Table 4-5: HHW Facility Collection Quantities (Pounds)

Year	Quantities in Pounds
2015	78,383
2016	72,070
2017	67,822
2018	93,316
2019	88,899

Other Special Waste Facilities. KDHE permits solid waste processing facilities. Table 4-6 lists the 2020 KDHE permitted facilities in Wyandotte County.

Table 4-6: KDHE Permitted Facilities in Wyandotte County

Company Name	Permit Type Issued
MedAssure Heartland, LLC	Transfer Station
Environmental Management of KC	Solid Waste Processor
Liquid Environmental Solutions	Solid Waste Processor
Kaw Valley Companies, Inc.	Tire Processor
Stericycle Inc. of KC	Incinerator, Solid Waste Processor, Transfer Station
BPU Nearman	Industrial
BPU Maywood	Industrial
Amsted Rail Company	Industrial
Kansas City, KS HHW	HHW
Planet Marrs Recycling	Composting
Woodland Lawn	Composting

Salvage Yards. Salvage yards do not require a permit from KDHE. A listing of the Wyandotte County salvage yards which are licensed in 2020 by the Unified Government's License Division is provided in Appendix D.

4.2 Current Facilities Analysis

Landfill options and capacity. There are limited landfills within the region and, presently, Wyandotte County is heavily dependent on the Johnson County Landfill. The Johnson County Landfill has approximately 20 years of remaining disposal capacity at the current disposal rates and it is not anticipated that this capacity would expand beyond the current permitted extents. The owner and operator of the Johnson County Landfill, Waste Management, also owns and operate the Rolling Meadows Landfill facility outside of Topeka, Kansas, which has more than 40 years remaining life. It is assumed that Waste Management may transfer waste to the Rolling Meadows Landfill as the Johnson County Landfill comes to the end of remaining life. Considering the extensive timeline required for the siting, planning, permitting, and construction of a new landfill facility, decision making regarding future disposal options for Wyandotte County should be finalized in the next 10 years. A new landfill facility could be developed by private developers, a public entity or group of public entities, or through a public-private partnership. Alternatively, the development of transfer stations would provide flexibility for the County to consider disposal options located further away.

Recycling processing options. The commercial MRFs within the region have the processing equipment and capacity to meet the County's current and future recycling processing needs for residential projections, insofar as these facilities do not reach capacity from other operations. Similar to the landfill discussion above, utilizing transfer stations provides flexibility for the County to have the option to utilize any of these MRFs in the future. As the commercial and residential recycling quantities increase, there may be the need for expansion of existing regional MRFs or the addition of new regional MRFs.

Transfer station planning. As described above, the use of transfer stations would provide flexibility for the County to consider disposal or processing options located further away if limitations occur with local disposal capacity. Transfer station planning, design, and construction takes significantly less capital investment and has a shorter timeline than the development of a landfill.

For example, the City of Olathe utilizes disposal facilities located as far as Lawrence, Kansas through the consolidation of waste at its transfer station. The City of Olathe anticipates an expansion of its transfer station to occur by 2025 due to the increasing population and waste generation in the City. As Wyandotte County considers landfill options over the next 10 years, there could be significant benefits in the development of one or more additional transfer stations in the County.

Organics processing options. There is limited infrastructure for organics composting in Wyandotte County. However, regional composting facilities have additional capacity available to receive more

organic material from Wyandotte County as an effort to divert more material is realized. Wyandotte County would enhance its ability to be successful with larger scale yard waste diversion programs by siting a public composting facility or through a public/private partnership. Availability of food waste composting is extremely limited within the region; however, it is anticipated that pilot programs will be developed, and supported by local regulatory agencies, to integrate food waste streams into existing composting facilities.

HHW options. The County owns and operates a permanent HHW facility. Service is limited to residents one Saturday each month, April through October. There are no other safe, appropriate options for residents to dispose of their materials. The facility is already designated and equipped to handle more material. Additional hours of operation along with trained, designated staff would provide a more robust program for the community to ensure proper disposal of household hazardous materials.

4.3 Public-Private Partnership Options

The County will need to rely on a combination of facilities going forward to meet needs for landfilling trash and processing recyclables and organics. This section describes various public-private partnerships that the County can consider and recommends specific partnership options for landfills, transfer stations, MRFs and organics processing facilities.

Public-private partnerships can be an effective model to provide needed infrastructure without the full financial risk falling on either the local government or the private business. Effective public-private partnerships exist when both local governments and the private industry collaborate to share resources, capital investment, risk, and revenue. When considering a public-private partnership, a local government should consider the degree to which it wants to be involved in the operations and capital investment of a facility.

There are advantages and disadvantages to the different types of arrangements and which entity takes ownership of the land, capital investment, and operations. While the processing or disposal services agreement is the most common, public-private partnerships are gaining more appeal as a means to share risk given recent market volatility. Table 4-7 provides an overview of the different public-private partnership options available to local governments and private businesses.

Table 4-7: Examples of Public Private Partnership Options for Processing/Disposal

Responsibility	County-Owned and Operated	County-Owned with Private Operations*	Privately Owned and Operated on County Land*	Processing/Disposal Services Agreement
Land Ownership	County	County	County	Private
Capital Investment	County	County	Private	Private
Operations	County	Private	Private	Private

*True public-private partnership arrangement

There are multiple examples of the various types of public-private partnerships in the greater Kansas City metropolitan region. All the landfills and MRFs are owned and operated by private companies and utilize agreements with cities or other haulers. At the other end of the spectrum, the County has a publicly owned and operated HHW facility.

Going forward, as disposal capacity decreases and Wyandotte County continues to increase diversion within the residential and commercial sectors, there may be a need for additional facilities. Looking toward more collaborative, public-private partnership-based approaches may provide a viable solution toward meeting the long-term facility needs for the County as a whole. The following section describes case studies on innovative public-private partnerships in the cities of Olathe, Kansas and Dallas, Texas.

4.4 Case Studies

4.4.1 City of Olathe, KS Transfer Station

The City of Olathe transfer station is an example of a facility owned by the city, with private operations. The City of Olathe currently utilizes a public-private partnership for the operation of its transfer station. The City owns the transfer station and contracts out the operation and associated hauling and disposal of the material accepted to a private company, currently Hamm, Inc. The contract also allows for the City to self-operate the transfer station if desired. This allows for significant flexibility in meeting the City's disposal needs as well as staffing and financial resources. This model could be replicated if the County were to develop one or more transfer stations.

4.4.2 City of Dallas, TX Materials Recovery Facility

The city of Dallas recognized the broader financial challenges associated with the recycling industry and pursued an innovative public-private partnership approach with a goal of increasing financial returns and recycling quantities for residents and businesses in Dallas and surrounding communities. This effort was

intended to support the city's Solid Waste Management Plan[36], passed in 2011 and updated in 2013 that intends to increase diversion to 90 percent by 2040. The strategy for developing the public-private partnership was based on the city's Resource Recovery Planning and Implementation Study[37].

The city of Dallas partnered with a private company in 2015 to design, build, and operate a new MRF to process recyclable materials from the city and other surrounding communities. This MRF is located on 15 acres at the McCommas Bluff Landfill (city-owned land), which provides an opportunity to become a broader resource recovery park with increased investment in materials management infrastructure. The newly built MRF can process approximately 120,000 tons of recyclable materials per year and started accepting recyclable materials from Dallas and other surrounding communities in January 2017.

The city of Dallas had historically been involved with traditional processing agreements with private recycling companies that had favorable financial terms for the city. Issues with this traditional contractual agreement became evident in 2012, when recycling markets crashed and commodity prices dropped. With advice from its consultant, the city realized the nature of processing agreements was changing, and when its contract for recycling processing services was up, the city knew it would have to take an innovative approach to provide greater financial stability given fluctuating markets. The city of Dallas entered into a 15-year agreement (public-private partnership) with a private recycling company, where the company covered the initial capital cost of the new MRF, and the city provided the land for the MRF to be built, which was land that would have otherwise been used for the landfill. The city pays a processing fee of $70.54 per ton to the MRF and has a 50/50 revenue share on the net revenues after the sale of recyclable materials. Since the MRF is built and operated on city-owned land, the private company will pay a "host fee" of $15 per ton to the city for material that is generated by non-city sources, as well as an additional public education fee of $1 per ton. Given that the recycling materials sold can change in value and that a portion of the financial agreement is based on the value of the material, when commodity values are low, the revenue net of processing fees could be negative for the city. However, because of this innovative

[36] *City of Dallas Local Solid Waste Management Plan 2011-2060*. HDR Engineering, Inc., in association with CP&Y, Inc. and Risa Weinberger & Associates, Inc. Updated 2013.
[37] *Consulting Services in Support of Resource Recovery Planning and Implementation*. Leidos and Burns & McDonnell. 2014.

public-private partnership and risk sharing agreement, the MRF operator agreed that the city of Dallas will never have to pay for recycling processing services, regardless of market conditions.

The city of Dallas provides weekly recycling curbside collection in 48-gallon, 64-gallon, or 96-gallon carts and as of 2013, the city had more than 237,000 single-family residential sanitation accounts. Materials collected for recycling include mixed paper, cardboard and paperboard, milk and juice cartons, aluminum, tin and steel cans, glass bottles and jars, and PET #1, HDPE #2, #3-5 and #7 plastic containers. The city operates its recycling collection program through a solid waste fee collected from its residents with city solid waste accounts.

The development of the new MRF provides an opportunity for surrounding areas to establish or expand their curbside recycling programs. The MRF is currently sourcing recyclable materials from Dallas and other cities in the region, potentially filling a gap for more rural or remote communities that have struggled with the transition from providing drop off only services to rolling out a curbside recycling program. This public-private partnership may serve as an example for other large metropolitan areas in Texas who are struggling with the financial realities of recycling given challenging market conditions.

5.0 SINGLE-FAMILY RESIDENTIAL REFUSE

Refuse is defined as the portion of MSW that is disposed in landfills. Ideally, refuse would only include materials that do not have the potential to be diverted from landfill disposal through recycling, composting or other means. However, as described in the Waste Characterization Study Section 3.6, about half of all material disposed in the landfill by Wyandotte County residents has the potential to be diverted. Realizing that potential has various challenges. One objective of this plan is to develop methods for the County to increase its diversion of materials from the landfill.

5.1 Current System Review

Each municipality in the County contracts residential solid waste services independently to a single private sector provider. Services vary per contact and are outlined in Table 5-1. An overview of each municipality's services is also described below, however, because such a significant portion of the population of Wyandotte County falls under the Unified Government contract, the remainder of this document will focus on the services related to that contract.

Table 5-1: Residential Services by Municipality

Municipality	Service Provider	Refuse	Recyclables	Yard Trimmings	Bulky Items
Unified Government and Bonner Springs	Waste Management	Weekly collection, unlimited volume; no containers provided	Weekly collection, 18-gallon totes provided by request	Comingled with refuse for landfill disposal	Included with weekly refuse collection
Edwardsville	KC Disposal	Weekly collection, 95-gallon carts provided, PAYT limited to cart	Weekly collection, 65-gallon carts provided	Yard trimmings are not permitted with the refuse; no service is included	Bulky item collection is per request from provider for a fee
Lake Quivira	Waste Management	Weekly collection, 65-gallon carts provided, PAYT limited to cart	Weekly collection, 65-gallon carts provided	Yard trimmings are not permitted with the refuse; no service is included	Bulky item collection is per request from provider for a fee

City of Bonner Springs. Bonner Springs is serviced under the Unified Government contract with Waste Management through an inter-governmental agreement. Information throughout this document that is specific to the Unified Government solid waste contract includes Bonner Springs.

City of Edwardsville. Beginning January 1, 2021, the City of Edwardsville will begin a new contract with KC Disposal, and services will remain largely the same. Service includes weekly collection of refuse from a 95-gallon cart and recycling from a 65-gallon cart by automated trucks. Yard trimmings are not permitted with the refuse, and no collection service is provided. Bulky item collection is not included in the contract; however, residents may contact their service provider for special pickup. The City of Edwardsville hosts an annual city-wide clean up event in the parking lot of city hall for residents to drop off bulky items, electronic waste, and scrap metal for recycling.

City of Lake Quivira. A portion of Lake Quivira is in Wyandotte County. Lake Quivira contracts with Waste Management for service. Service includes weekly curbside collection of refuse and recyclables from provided 65-gallon carts. Residents are limited to one cart and one additional bag of refuse per week; additional bags may be set out with a purchased sticker. Yard trimmings are not permitted with refuse and no service is provided. Bulky item collection is not included in the contract; however, residents may contact Waste Management for special pickup. Data that is specific to the portion of homes located in Wyandotte County is not available and therefore not included in the calculations throughout this document.

Unified Government of Wyandotte County/Kansas City, KS. The Unified Government is currently under contract with Waste Management until December 31, 2032. Residents are billed for solid waste services through the Unified Government via BPU. Service includes single-family residential dwellings up to a four-plex. Weekly collection of refuse is performed by manual or semi-automated rear-loading trucks. Refuse is collected in unlimited quantities with no carts provided; residents set out waste in a wide range of container types and sizes. Recyclables are collected weekly in 18-gallon totes. Yard trimmings and bulky items are comingled with MSW.

Other than recyclables set out separately for recycling, all residential MSW collected curbside is currently collected with refuse service and landfilled. This includes unlimited quantities of yard trimmings and bulky items, presenting an opportunity for the Unified Government to increase its diversion rates of these items.

5.2 Options

Continue current service. Kansas City and Bonner Springs may continue to combine material collection (refuse, yard trimmings, bulky items) in unlimited quantities. This option provides the least incentive for diversion of materials from the landfill. The Cities of Edwardsville and Lake Quivira already separate refuse, yard trimmings, and bulky items.

Transition to a cart-based system and limit quantities. Transition to cart refuse collection. Provide all customers with a collection cart for refuse that can be collected with an automated truck.

Separate collection of bulky items. Reduce bulky item set out to a less frequent schedule such as monthly or quarterly. Bulky items could still be co-collected with refuse but on a less frequent basis. Details for additional service options and recommendations are provided in Section 7.0, Bulky Item Collection.

Separate collection of yard waste. Providing separate collection of yard waste would allow the material to be diverted for composting. Details for additional service options and recommendations are provided in Section 8.0, Organics.

5.3 Recommendations

Based on the current system review, implementation of previous solid waste management plans, and an evaluation of options, the following recommendations are being made pertaining to the residential sector.

1. **Yard trimmings collection service.** Provide separate collection and processing of yard trimmings. Detailed recommendations for management of yard trimmings is provided in Section 8.0.
2. **Bulky item collection service.** Reduce frequency of bulky item collection. Collection could be either monthly or quarterly to encourage more consistent service. Detailed recommendations for management of bulky item collection is provided in Section 7.0.
3. **Transition to cart-based refuse service.** Weekly cart-based refuse service would better align with current industry practices. A variance would need to be allowed for residents where carts are not practical.

6.0 RESIDENTIAL RECYCLING

Single-stream recyclables are materials that are accepted through curbside recycling programs, processed through materials recovery facilities (MRFs), and sold as commodities to markets where the material is then made into new products. In the County's current MSW management program, its single-stream recycling service is the predominant source of MSW diversion.

6.1 Current System Review

Single-family residential recycling. The Unified Government's residential collection contract has included weekly curbside recycling service to residential single-family dwellings (up to a four-plex) since 2007. The program is voluntary participation with mandatory pay through the current collection contract. Residents set out recyclable material in 18-gallon totes or self-labeled containers.

As a part of the current collection contract, Waste Management provided a limited number of recycling totes for residential use. An initial 20,000 bins were distributed to customers who requested them when the program first started. Those recycling totes may be provided upon request and residents must pick them up during hours of operation at the Neighborhood Resource Center. A few hundred bins become available each year and there is always a demand for them[38]. Customers that are not able to obtain one of the recycling totes from the Neighborhood Resource Center have to purchase a tote at their own expense and mark it with the word "Recycling" or the recycling symbol.

The City of Edwardsville transitioned to a cart-based program in 2016. Each single-family residence is provided with a 65-gallon cart for recycling, collected weekly by the contractor (Waste Management through 12/31/20; KC Disposal beginning 1/1/21).

Accepted recyclables. Accepted recyclables and common non-accepted items contributing to recycling contamination are summarized below.

- Accepted recyclables: Paper, cardboard, plastic containers #1-#7, aluminum and steel cans
- Unacceptable materials (common contaminants): Plastic bags and film, glass, pizza boxes, Styrofoam, hangers and large metal items, textiles, and garden hoses

[38] 2020 Annual Solid Waste Management Committee meeting notes.

Drop-off recycling activities. Recycling drop off facilities are especially valuable for the multifamily sector and small businesses to have access to recycling. There are three permanent recycling drop off facilities:

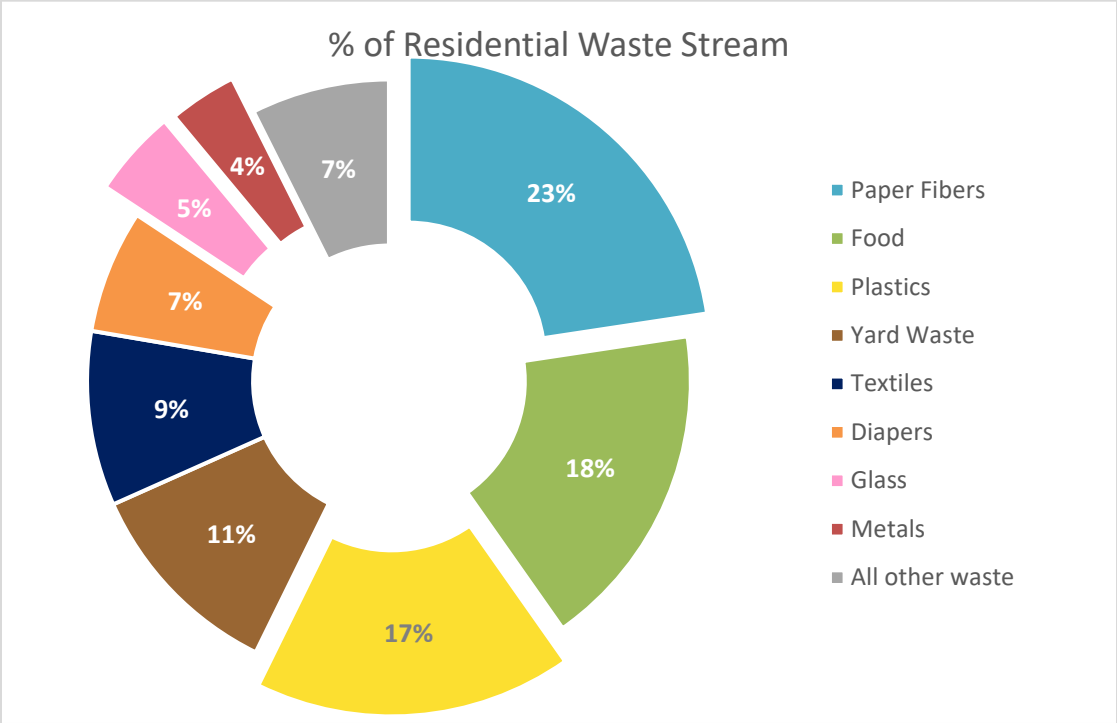
- Unified Government Recycling & Yard Waste Center located at 3241 Park Drive;
- The City of Bonner Springs Recycling Drop Off Center located at the Public Works Department, 12401 Kaw Drive; and
- Waste Management recycling drop off center at the landfill entrance at 17955 Holiday Drive, Shawnee, KS.

Ripple Glass provides glass recycling in the Kansas City metropolitan area. There are 8 glass recycling drop off locations throughout Wyandotte County.

Recycling rate, quantities, and participation. In 2019, the County diverted 3,665 tons of material through recycling activities (including Unified Government, Bonner Springs, and Edwardsville). The residential MSW recycling rate was 5.8 percent. Traditional recyclables (i.e., paper, plastic, metal, and glass) comprised most of the recycling activity at 4.9 percent, while yard waste, HHW and e-waste recycling comprised less than one percent each.as described in detail in Section 3.4.1.1, Residential MSW.

The County's diversion rate lags behind the state and national averages. The State of Kansas has a diversion rate of 31 percent, and the national average is 35 percent. This represents great opportunity to increase the diversion in Wyandotte County by increasing participation in recycling and yard waste diversion. Based on the Waste Characterization Study (see Section 3.6), Wyandotte County residents are throwing away recyclable materials. The potential materials that could be diverted through recycling could increase the diversion by 30 percent. While it is not likely that all potential material will be captured through recycling, there is a significant opportunity to divert more recyclables. Figure 6-2 reflects the waste disposed of as MSW and highlights the potential curbside recovery.

Figure 6-1: Wyandotte County Residential MSW Curbside Recovery Potential



6.2 Options

Continue current service. Kansas City and Bonner Springs residents currently receive weekly collection of recyclables in 18-gallon totes. Currently, all customers pay for the recycling service in their base rate, however, not all customers have been provided a recycling container. The recycling containers limited in number and not always available. The capacity of an 18-gallon tote is small and does not encourage the recycling of large quantities of materials. If this option is chosen to continue, at a minimum, all customers should be provided a recycling container to encourage participation.

Cities of Edwardsville and Lake Quivira currently receive weekly collection of recyclables in 65-gallon carts provided by their service provider.

Weekly collection in carts. Provide all customers a recycling cart and continue weekly collection. The increased capacity will promote recycling and provide everyone with an equal opportunity to utilize the service. Table 6-1 compares the advantages and challenges of the various options described above.

Table 6-1: Advantages and Disadvantages of Recycling Collection Options

	Weekly in 18-gallon Totes	Weekly in Carts
Advantages	• No changes to the current system	• Convenient • Increased capacity
Disadvantages	• Limited capacity • Open top contributes to litter and exposure to weather	• Transition period to a new cart system

Education and Outreach. Critical to increasing recycling quantities and quality of materials collected is a commitment to education and outreach by the County. Contamination in the recycling stream is a significant issue as it directly relates to processing costs. Additional information regarding education and outreach recommendations is provided in Section 12.0.

6.3 Recommendations

Based on the current system review, implementation of previous solid waste management plans, and an evaluation of options, the following recommendations are being made pertaining to the residential sector.

1. **Provide all customers with a collection container**. While all Kansas City and Bonner Springs customers currently pay for recycling service as part of their base rate, only around half of the customers have been provided a collection container. As a provision of the current contract with Waste Management, all customers should be provided a recycling container. When containers are delivered, educational material should accompany them with proper recycling information.
2. **Transition to cart-based recycling service.** In the long-term, providing carts which are larger than the currently provided totes will increase the amount of recycling collected from each household.
3. **Seek a variety of options in the procurement of services.** Request during the next bid process that vendors provide cost for a variety of service options including weekly and every other week collection. Providing a 95-gallon cart, for example, is sufficient capacity for most customers to switch to every other week collection. While weekly collection is preferred for its convenience, every other week collection may be the most cost effective. Every other week collection might also allow other materials such as yard trimmings, to be collected on alternative weeks.

4. **Education and outreach**. Ongoing recycling education is critical to keeping the community informed. Detailed recommendations for education and outreach are provided in Section 12.0.

7.0 BULKY ITEM COLLECTION

Bulky items are typically defined as items that are too large to fit inside a refuse cart and cannot be collected with any other curbside service (e.g., single-stream recycling, yard trimmings, etc.). Standard bulky collection includes items such as furniture and large appliances, with some cities choosing to accept a wider range of material. This section addresses bulky item management as well as illegal dumping.

7.1 Current System Review

Single-family residential services. Under the current Unified Government residential collection contract, the service provider does not collect bulky items separately. Bulky items are managed as a component of the refuse stream and are included in the refuse cost of service. Bulky items may include the following:

- Large household furniture such as mattresses, sofas, chairs, and tables
- Appliances such as stoves, washers, dryers, and hot water tanks
- Lumber (bundled)
- Tree and brush clippings (bundled)

Providing the collection of bulky items with regular scheduled routes and collection frequencies is convenient for customers. Regularly scheduled service helps to mitigate illegal dumping.

Under the current contract for the City of Edwardsville, residents are not provided bulky item collection. Residents may contact their provider for to schedule collection of bulky items for a fee. The City of Edwardsville also hosts an annual bulky item collection event.

Drop off services. In addition to weekly curbside collection of bulky items, residents can self-haul their material to the WM Johnson County Landfill or other surrounding landfills for a fee.

7.2 Options

Continue current service. The Unified Government contract includes bulky items in unlimited quantities with the weekly refuse service. This option would not require changes to current operations and would not require significant public education and outreach efforts. Refer to Section 5.0 (Single-Family Residential Refuse) for additional information regarding current refuse service and potential refuse service options.

Reduce collection frequency of bulky items. Restrict bulky item set out to a less frequent schedule such as monthly or quarterly. Bulky items could still be co-collected with refuse but on a less frequent basis.

Provide separate bulky item collection. A separate bulky item program provides residents convenient service for disposal of those items. The Cities of Edwardsville and Lake Quivira do not include bulky item collection with their waste contractor; residents must manage disposal of this material on their own. Options for a separate bulky item service include:

- **Regular, scheduled service.** Providing separate collection of bulky items with regular scheduled routes and collection frequencies. Customers are still provided regularly scheduled service to mitigate illegal dumping. Service frequencies can range from monthly to quarterly to annually. It is recommended that quantities be limited to a specific quantity.

- **Call-in program**. A call-in program provides customers with bulky item collection services on an as-needed basis. Customers contact the contractor when they have a service need and schedule a collection date and time.

Table 7-1 compares the advantages and challenges associated with each of these options to provide context for the following recommendations.

Table 7-1: Comparison of Bulky Item Collection Options

	Weekly Out of Cart	Monthly or Quarterly Collection	Call-In Service
Advantages	• Convenient for customers • Customers are used to system • Decreases illegal dumping	• Convenient for customers • Customers are more accustomed to system	• Provided on an as-needed basis
Disadvantages	• Disincentivizes diversion of material	• Customers may require more service • May lead to increased illegal dumping	• Customers are not used to system • May lead to increased illegal dumping

7.3 Addressing Illegal Dumping and Littering

Current system review. Each city is responsible for responding to illegal dumping and developing strategies to decrease its occurrence. For example, the Unified Government currently responds to illegal dumping through the Public Works' program, Quick Response Trash Team, in coordination with County Code Enforcement. The primary offenders of illegal dumping are believed to be commercial generators.

Section 9.0, Commercial and Multifamily Residential, further discusses options for addressing illegal dumping from the commercial sector.

The Unified Government is working to educate the community about illegal dumping and littering through the Stabilization, Occupation and Revitalization (SOAR) program. SOAR is a 5-year plan to confront some of the most pervasive challenges in the appearance, communication, and safety of Wyandotte County neighborhoods. In addition to addressing illegal dumping and littering, it aims to address issues like vacant and abandoned homes, property maintenance, loose dogs, poorly maintained streets, a lack of trails and sidewalks, mowing frequency, graffiti, and more.

Preventing illegal dumping. Changes to the bulky item collection program should be thoroughly communicated with the public to prevent any resulting illegal dumping. Coordination with the SOAR program will be an opportunity to address and prevent additional illegal dumping. Key elements of a successful preventative illegal dumping program include the following:

- **Adequate disposal options.** Ensure that residents maintain access to bulky item disposal options. This includes access to curbside collection (either regularly scheduled or through a call-in program), and access to on-going drop off options.

- **Enforcement**. Illegal dumping must be investigated, and legal action taken against the people responsible for littering and illegal dumping. Resources should be put toward regular patrolling and surveillance of known illegal dumping sites, and quick response to reports of illegal dumping.

- **Education and outreach.** Residents must be made aware of the legal consequences for illegal dumping to detour them. Residents must also be educated on all the appropriate options available for proper disposal.

7.4 Recommendations

Based on the current system review, implementation of previous solid waste management plans, and an evaluation of options, the following recommendations are being made pertaining to the residential sector.

1. **Reduce bulky item collection frequency.** Restrict bulky item set out to a less frequent schedule such as monthly or quarterly. Bulky items could still be co-collected with refuse but on a less frequent basis.

2. **Bulky item drop-off options.** Increase the availability of free or low-cost, convenient drop off locations for bulky items. This could include drop off at local landfill or transfer stations or drop

off facilities or events provided throughout the year at various locations within the County. Include provisions in the next service procurement process; consider requiring as part of a special use permit for future landfill or transfer station facilities; add service to existing County drop off location.

3. **Education and outreach.** Initial and ongoing recycling education is critical to keeping the community informed. Detailed recommendations for education and outreach are provided in section 11.0.

4. **Illegal dumping prevention.** Changes to the bulky item collection program should be thoroughly communicated with the public to prevent any resulting illegal dumping. Coordination with the SOAR program will be an opportunity to address and prevent additional illegal dumping. Key elements of a successful preventative illegal dumping program include adequate disposal options, enforcement, and education and outreach.

8.0 ORGANICS

The organics waste stream includes both yard trimmings and food waste. Yard trimmings include material such as leaves, grass clippings, limbs, brush, and other plant trimmings. Food waste includes fruits and vegetables, meats, eggs and dairy, coffee grounds, and food-soiled paper products such as napkins, pizza boxes, and various types of cardboard and paper food containers that are compostable.

8.1 Current System Review

Single-family residential services. The Unified Government's current residential collection contract does not require separate collection of organic materials. All organic materials collected through curbside residential services, including both yard trimmings and food waste, are collected and comingled with refuse and landfilled at the Johnson County Landfill. The City of Edwardsville's residential collection contract prohibits yard trimmings and separate collection service is not provided. Residents are responsible for managing yard trimmings through mulch-mowing, backyard composting or self-hauling to a drop-off site.

Currently, there are no subscription curbside services available to county residents other than full service lawncare companies who manage lawns and haul the debris. However, in surrounding communities with restrictions on yard trimmings, subscription curbside service is available from a variety of private companies. There is one company in the metro collecting food waste from residential customers on a subscription basis.

Drop off yard trimmings and brush. Residents have the option to self-haul yard trimmings and brush to either the County's Recycling and Yard Waste Center or the Waste Management drop off facility for no charge. The County's Recycling and Yard Waste Center is a collection point only. All material is stored in 40 yard roll off bins which are hauled to the compost facility at the Johnson County Landfill by Waste Management. The majority of material received is brush and limbs. This type of material is bulky and is an inefficient use of the space in a roll off box which increases the cost per pull. Chipping the material onsite or expanding the program into a composting program, at the drop off location or elsewhere, would have many benefits. Processed material could be used by County departments such as Parks and Recreation or Public Works as mulch or compost in landscaping or building projects.

Organics generation and diversion. In the 2016 Waste Characterization report for Wyandotte County, yard trimmings accounted for 11 percent of total residential MSW generation and food waste accounted

for 18 percent (see Section 3.6, Waste Characterization). These organic materials have the potential to be diverted from the landfill, presenting a significant opportunity to increase diversion through composting.

In 2019, a total of 535 tons of yard trimmings and brush were received at both drop off facilities combined. Overall, material from the drop off facilities is 0.9 percent of the total waste generated (see Section 3.4.1.1, Residential MSW). Some residents may divert small quantities through activities such as backyard composting or grass-cycling, but this represents a small portion of total yard trimmings generation.

Regional yard waste composting infrastructure. The Unified Government entered into a memorandum of agreement with Johnson County, Kansas Government to allow yard trimmings from their residents to continue to be landfilled based on their existing contract for waste removal. There is currently adequate infrastructure in place in the Kansas City Metro Area for collection and processing of yard trimming material. Private companies such as Waste Management and WCA operate composting facilities to manage material collected from curbside programs. Public entities such as the Cities of Olathe and Lawrence operate composting operations to service their communities. There is an opportunity for Wyandotte County to develop a composting facility to divert residentially generated yard trimmings as well as process material from other sources (see Section 4.1.4 for details for a potential County owned compost facility).

8.2 Options

Continue current service. Continue acceptance of all organics with refuse collection. With this option, the Kansas City and Bonner Springs would not capture the potential for increased diversion from yard trimmings. A benefit of this option is decreased illegal dumping of yard trimmings. Refer to Section 5.0, for additional information regarding current refuse service and potential refuse service options.

Provide separate yard trimmings collection. Work with the contractor to provide separate yard trimmings collection service for residents, creating opportunity to increase diversion rates. Effective implementation of a new yard trimmings collection program would require significant public education and outreach efforts by the County (refer to Section 12.0). Table 8-1 compares the advantages and disadvantages to the various options for collecting yard trimmings.

Table 8-1: Advantages and Disadvantages of Yard Trimming Collection Options

	Co-mingled with Refuse for Landfill Disposal	Separate Collection
Advantages	• No changes to the current system	• Convenient • Increased diversion potential
Disadvantages	• Missed opportunity for diversion	• May lead to illegal dumping • Transition to a new system requires significant education and outreach.

Provide separate brush collection. Brush refers to branches and limbs that exceed the limits of the yard trimmings program which are larger and bulkier in nature. The Kansas City and Bonner Springs may choose to provide collection of this material as a separate waste stream. The frequency may vary from monthly to annually.

County owned composting facility. The Unified Government has expressed an interest in developing a County owned composting facility. Yard trimmings collected from residential routes and other potential feedstocks (food waste, bio-solids, tree, and brush) could be composted or mulched and be used in County operations or sold. The facility could be developed through a public-private partnership, allowing for flexibility with capital and operating equipment and labor expenses. There are many benefits to the County for owning such a facility (see Section 4.1.4 for details for a potential County owned compost facility).

8.3 Recommendations

Based on the current system review, implementation of previous solid waste management plans, and an evaluation of options, the following recommendations are being made pertaining to the residential sector.

1. **Provide separate yard trimmings collection.** The Kansas City and Bonner Springs should work with their waste contractor to provide residential customers with separate yard trimmings collection in paper bags and bundles as part of standard MSW services. The Cities of Edwardsville and Lake Quivira should consider separate yard trimmings collection for residents. This will allow the County to divert additional material from landfills and, over time, may significantly increase its overall diversion rate.

2. **Continue to consider long-term potential for food scraps diversion.** Significant quantities of food scraps that have the potential to be diverted through composting are currently being landfilled. However, there are not curbside options available for food scraps collection and processing. In the long-term, the County should consider food scraps diversion, depending on development of markets, local processing options, and residential demand. These should be used as factors in determining if, when, and how provision of food scraps collection may be financially feasible for the County.

3. **Composting education.** Provide public information and education programs to explain and promote backyard composting of food waste.

4. **County composting facility.** The County should further evaluate a potential publicly owned composting facility.

9.0 COMMERCIAL AND MULTIFAMILY RESIDENTIAL

The commercial sector includes material generated by commercial, institutional, and multifamily properties. Examples of these commercial properties include restaurants, retail, offices, schools, hospitals, industrial facilities, and apartment complexes. While multifamily properties are occupied by the residential sector, waste from these properties is comingled with commercial sector upon collection and therefore considered commercial waste. There is significant diversity in the amount and types of waste collected, collection frequency, container types, and collection vehicles that service various generator types.

9.1 Current System Review

Commercial. The County's commercial properties contract for trash and recycling collection services through private haulers on an open market system. Services are typically provided via dumpsters, roll-off containers, or compactors and vary by hauler. There are no County or City solid waste regulations pertaining to commercial entities or commercial MSW haulers.

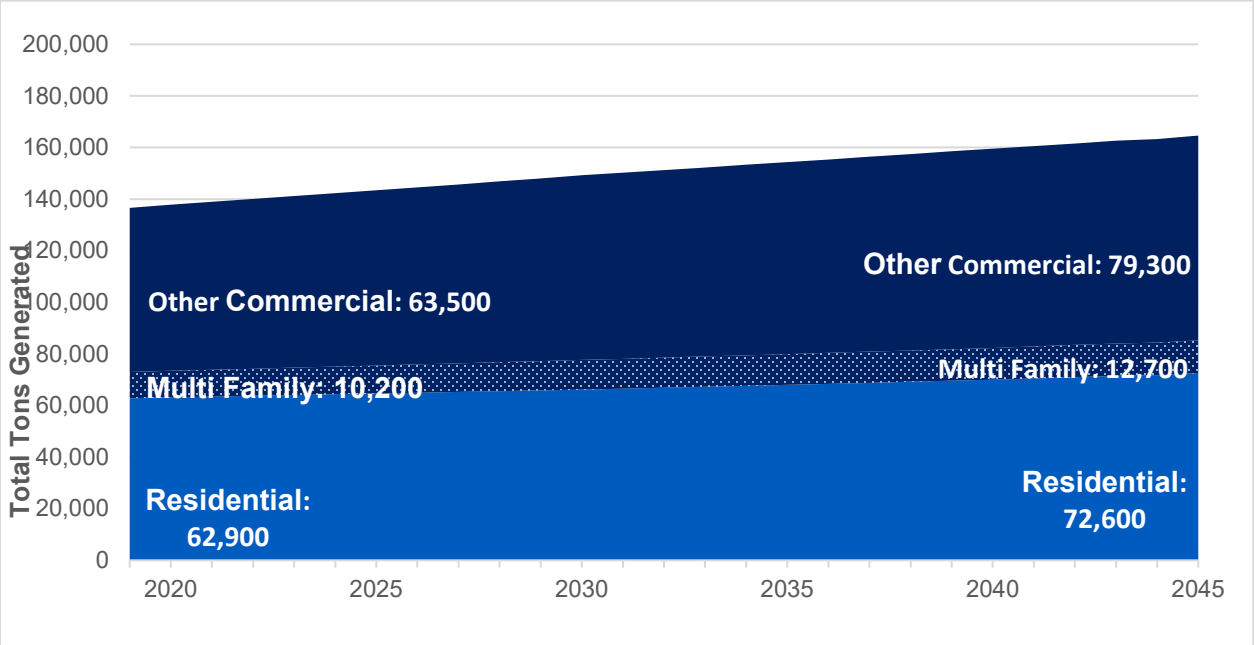
Multifamily. Multifamily residential refers to residential properties within the County which do not receive curbside service under the County's residential solid waste and recycling program. This includes properties having greater than four individual housing units (e.g., apartment complexes, condominiums, assisted living, etc.) and select trailer courts.

Recycling options. Recycling is an optional additional service and is not provided by all commercial haulers. There are currently no requirements for the provision of recycling services to commercial or multifamily properties, although, some properties choose to offer recycling collection services. Limited space or inconvenient configuration is often restrictive for properties looking to provide recycling collection. The recycling drop-off facilities are free and use by commercial and multifamily generators is encouraged; however, service ease and convenience are important factors that impact participation in any program.

Other diversion options. Yard waste generated from commercial and multifamily properties is typically handled by a landscaping contractor who is responsible for the material transport and disposal, usually at a compost facility. Food waste collection and composting is available from Missouri Organics Recycling, although a very limited number of food waste generators opt to contract for this service. Glass recycling collection is also available from several providers but again, a very limited number of glass generators contract for this service.

Commercial MSW generation. The commercial sector produced approximately 54 percent of the County's total MSW generation, which totals an estimated 73,700 tons of material in 2019 (as described in Section 3.3.2). An estimated 10,200 tons of the commercially generated MSW was generated by multifamily households. Figure 9-1 shows the waste generation forecast for commercial, multifamily, and residential.

Figure 9-1: Wyandotte County MSW Forecast (Tons)



The commercial sector presents a significant opportunity for waste diversion. However, because there is no current requirement for reporting commercial generation data, there are limitations on understanding the quantities, diversion, generators, and material types. Reporting requirements would assist in future efforts to promote diversion and waste minimization.

9.2 Options

Commercial hauler requirements. License commercial MSW haulers and require specifications for reporting waste and recycling haul data. Further requirements can be established through a licensing program such as mandatory service provisions for specific types of waste (i.e. recyclables, organics). A licensing program requires administrative and enforcement support to be successful.

Commercial generator requirements. Require through regulations that commercial and multifamily properties plan for recycling and diversion based on their generation. This option requires extensive staff

support considering the number of commercial properties in the County as well as the diversity of waste generated from property to property.

Building permits. Require new or renovated commercial and multifamily properties to construct enclosures that will accommodate recycling containers.

Incentives. Utilize planning and zoning codes to encourage economic development strategies that include recycling plans or green initiatives requirements as part of financial incentives packages.

Education and outreach. Provide public information, educational programs, and presentations to explain and promote source reduction and recycling. Provide technical assistance to identify ways that participation can be increased where diversion and recycling options exist.

9.3 Recommendations

Based on the current system review, implementation of previous solid waste management plans, and an evaluation of options, the following recommendations are being made pertaining to the commercial sector.

1. **License haulers.** Create a commercial hauler licensing program and require annual reporting of MSW quantities collected to be a provision of the license. This will lay the foundation for future diversion efforts. It will provide the County with a better understanding of the commercial generation data and where opportunities exist. There is a relatively manageable number of commercial haulers and can be administered in conjunction with the business licensing program.

2. **Business license requirement for solid waste removal.** Require as a provision of the current business licensing program that waste removal services are provided. All businesses wishing to conduct business in a physical commercial building must include in their base level of utilities the removal of solid waste. Enforcement can be added to the Building Inspection which is already a function of the License Division's process.

3. **Provide education and outreach**. Increase technical support for commercial and multifamily properties through online resources and technical assistance. Where staffing is available, a free technical assistance program could work with businesses to identify ways that participation can be increased where diversion and recycling options exist.

10.0 CONSTRUCTION AND DEMOLITION

Construction and demolition (C&D) is defined as materials that are generated by construction, demolition, or renovation projects and includes, but is not limited to, materials such as brick, roofing materials, wood, flooring, drywall, insulation, concrete, and asphalt. C&D debris is generated from residential, commercial, and public sector projects.

10.1 Current System Review

Current system overview and generation. There are no C&D landfills located in Wyandotte County, so all material generated is hauled out of county for disposal. There is no reporting requirement for hauling C&D waste, so the actual quantities generated within the County are unknown. Burns & McDonnell analysis based on employment-based estimates assumed 90,200 tons of C&D debris were generated in Wyandotte County in 2019 (see Section 3.4 for more detailed analysis). This represents a significant portion of the County's total material disposal. Some portion of C&D debris generated within the County is diverted from landfill disposal through C&D recycling processing, but quantities are unknown. The potential for increased C&D recycling presents an opportunity to increase the County's landfill diversion rate.

C&D recycling and recovery. The largest driver of C&D recycling currently occurring in the County is through sustainable building program efforts led by contractors and building owners (e.g. Leadership in Energy and Environmental Design (LEED) certified). C&D landfills may also crush limited quantities of building materials to be reused onsite, but these quantities are unknown. Higher proportions of asphalt debris from road and bridge construction may be recycled because it is typically a less mixed or contaminated waste stream than other C&D debris. Road asphalt debris may be milled, crushed, and re-melted for use in new asphalt.

There are limited recovery facilities for handing C&D debris throughout the metro. It is unknown if the existing recovery facilities have capacity to handle additional material. Further, markets for end use of the recoverable materials must be enhanced to absorb any additional materials. A more in-depth study would be required to better understand the C&D recovery system.

Small quantities of C&D debris are diverted through reuse programs, such as the Kansas City Habitat for Humanity ReStore. During the past two years, Habitat ReStore has sold an average of approximately 214 tons of donated residential building material for reuse, diverting that material from landfill disposal.

County C&D diversion efforts. In 2016, as part of the demolition contract of the Unified Government's old Indian Springs building, the contract was written to salvage concrete and steel from the structure. Approximately 53,740 tons of concrete was recovered from the structure and 4,760 tons of steel was recovered. This totals 58,500 tons diverted from the landfill for this demolition project.

10.2 Options

C&D diversion requirements. Adopt requirements for C&D recycling/reuse in a C&D ordinance or building permit. This could include methods such as buy-recycled (first choice) programs, green building and LEED ordinances, and mandatory C&D recycling.

C&D permit incentives. Offer incentives through the permitting process to encourage diversion such as fast track permitting for projects with recycling plans, or refundable deposits for projects demonstrating that a high percentage, e.g., 75 percent of C&D debris has been delivered to a recovery facility.

10.3 Recommendations

Based on the current system review, implementation of previous solid waste management plans, and an evaluation of options, the following recommendations are being made pertaining to the C&D sector.

1. **Lead by example**. The County should require minimum standards for C&D recycling on all County funded projects as well as supporting end use markets by requiring recycled material (i.e., crushed concrete) used on all applicable County projects. This could be an adoption of LEED, Envision, or similar sustainability standards or Envision for all County projects.

2. **Education and outreach**. Include education and outreach information for reuse and recycling to be included in all building permit applications.

11.0 HOUSEHOLD HAZARDOUS AND OTHER WASTES

Per K.S.A. 65-3405, Wyandotte County is responsible for ensuring the management of the following wastes not covered in previous sections of the SWMP:

- Household hazardous waste
- Small quantities of hazardous waste
- Lead acid batteries
- White goods containing chlorofluorocarbons
- Pesticides and pesticide containers
- Motor oil
- Consumer electronics
- Medical waste
- Wastes generated by natural disasters

The remainder of this section evaluates the current system for each material type identified above as well as others within the County.

11.1 Household Hazardous Waste

The purpose of an HHW collection program is to provide residents with access to safe and proper disposal options for household materials that are not suitable for disposal in a landfill or for collection with other curbside residential programs.

Current system review. The County owns and operates a Household Hazardous Waste Collection Facility (County HHW Facility), located at 2443 S 88th Street. The County HHW Facility is open to residents one Saturday each month, April through October. There are no specified limits of material quantities a resident may drop off, but all waste must be of residential origin. Home business, small business, commercial, and industrial wastes are not accepted.

Accepted materials. HHW materials accepted at the County's monthly events are typical of large HHW collection events and permanent collection and disposal programs. Traditional HHW materials accepted include, but are not limited to:

- Automotive fluids
- Paints
- Solvents

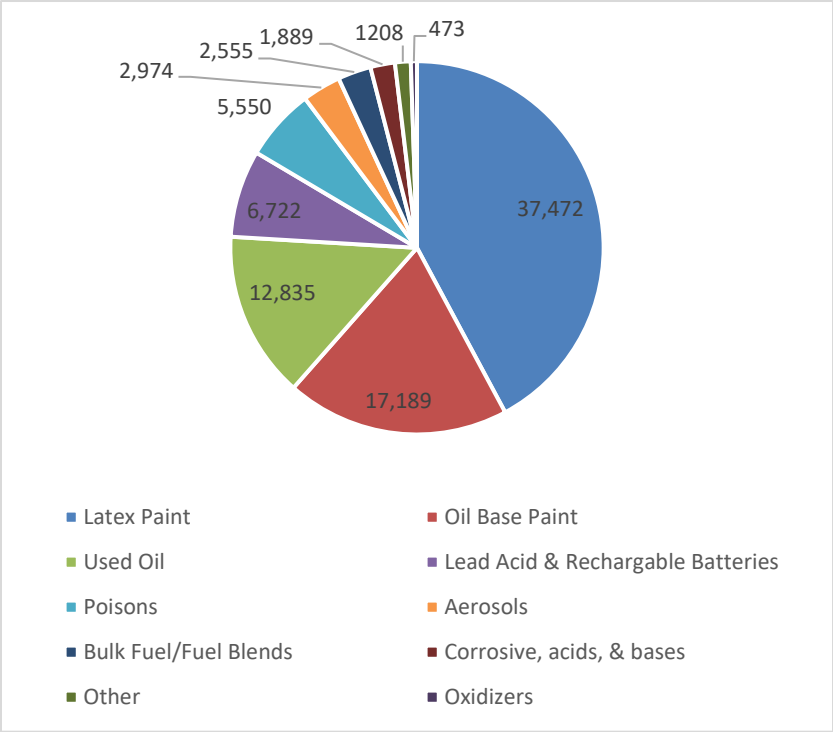
- Household cleaners
- Lawn and garden chemicals (herbicides and pesticides)
- Pool chemicals
- Other household chemicals with caution, warning, or poison labels

Participation and material quantities. Household hazardous waste represents less than one percent of the residential waste stream in Wyandotte County. In 2019, approximately 44 tons of material was collected from 1,345 event participants, equating to 66 pounds per participant. However, as shown in Table 11-1, event participation and average amount of material collected per participant has fluctuated over the life of the program. Figure 11-1 depicts the overall quantities of each category of material collected by type.

Table 11-1: HHW Event Collection Quantities and Participation

	2015	2016	2017	2018	2019
Total Pounds	78,383	72,070	67,822	93,316	88,899
Total Tons	39.19	36.04	33.91	46.66	44.45
Total # of Cars	1,089	879	677	764	1,345
Pounds per participant	71.98	81.99	100.18	122.14	66.10

Figure 11-1: Distribution of Materials in Pounds Collected at HHW Events in 2019



Program evaluation. The County understands the importance of providing convenient and affordable environmentally sound disposal options for potentially harmful residential wastes and has consistently provided collection events at no cost to customers for more than a decade. Effective public education and outreach has led to well-attended events. Because events are only once per month, customers may have to store unwanted and potentially hazardous chemicals for long periods of time, unless they are willing to find other, less convenient options outside of the County. Infrequent events also lead to a high demand for service among residents when the events occur, causing long lines and wait times. Events are well-attended, but some residents may find these inconveniences prevent them from attending.

Relative to surrounding communities, the County's current program provides a low service frequency. Additional events or collection opportunities would increase customer convenience and would likely have a positive impact on customer satisfaction.

11.2 Other Wastes

Small quantities of hazardous waste. Commercially generated hazardous waste is regulated by KDHE unless it meets specific standards qualifying it as small quantities of hazardous waste. This is usually material that is incidental such as through building maintenance. It is typically the same types of materials generated by households such as paint, cleaning products and lawn and garden products. The County HHW Facility only accepts material from residential customers. Commercial generators of hazardous waste must contract directly with hazardous waste management companies for safe, legal disposal.

Lead acid batteries. Lead acid batteries are not considered hazardous waste if they are intact and recycled. Split or broken batteries must be handled as hazardous waste. Automotive facilities recycle batteries through their operations and often provide recycling to County residents free of charge. The County HHW Facility also accepts automotive batteries from residents.

White goods containing chlorofluorocarbons. White goods are major household appliances such as refrigerators, washing machines, and water heaters. Appliances containing chlorofluorocarbon (CFC) are required to have the coolant evacuated before disposal by a certified recycler with certified equipment. Currently, white goods are collected weekly with the residential curbside program and separated for appropriate disposal by the contractor in accordance with the law.

Pesticides and pesticide containers. Pesticides and herbicides are accepted at the County HHW Facility and is disposed of as hazardous waste through a hazardous waste contractor.

Motor oil. Automotive facilities recycle motor oil through their operations and often provide recycling to County residents free of charge. The County HHW Facility also accepts waste oil from residents.

Consumer electronics. Consumer electronics are permissible in the landfill, however, the County encourages recycling of electronic waste. For more than a decade the County has hosted two annual recycling collection events open to the public. Electronics accepted at these events have included the following: computers, printers, monitors, TVs, cell phones, DVDs, fax machines, stereos, radios, gaming devices, VCRs, cameras, and other electronic items. Since the first event in 2007, there has been a combined total of 288.2 tons of material collected for recycling.

In addition, the following businesses accept electronic waste year-round in Wyandotte County:

- Secure E-cycle
- Best Buy
- Staples
- Office Depot
- Office Max

Medical waste. Medical waste is waste which can cause infections in humans upon exposure including human blood and blood products, isolation waste, pathological waste, and discarded sharps. Medical waste is collected by licensed medical waste haulers. There are multiple processing facilities and transfer stations for medical waste within Wyandotte County including Stericycle, MedAssure Heartland, LLC and Wellbeing Midwest located in Johnson County.

The following guidance has been provided by KDHE regarding the management of sharps:

> In Kansas, it is currently legal to place sharps in a sealed puncture resistant bottle that is disposed of in household trash or municipal solid waste generated at any location that is not a regulated health care provider. Special rigid sharps containers can be purchased from pharmacies and other medical supply companies that are suitable for disposal with other trash. Prior to placing any sharps container in the trash, write "DO NOT RECYCLE - SHARPS" on the container. Examples of other containers that may be used for medical sharps are bleach, liquid soap, or laundry soap containers or a metal container with a screw on lid.[39]

[39] Available online: http://www.kdheks.gov/environment/sharpsdisposal.html

Tires. Automotive facilities recycle tires through their operations and often provide recycling to County residents for a fee. The County HHW Facility also accepts tires. Tires collected are transported to regional waste tire facilities for recycling. There is a waste tire facility permitted by KDHE within the Wyandotte County, Kaw Valley Companies.

Beneficial use of scrap tires is included in K.A.R 28-29-29a and includes bumpers, playground equipment, windbreaks, erosion control, and stabilization of soil or sand. Tires which are disposed of in a landfill facility must be processed by any of the following means per K.A.R. 28-29-29: shredding, cutting in half along the circumference, cutting into at least four parts (with no part being greater than 1/3 of the original tire size, chipping, crumbling, baling in a manner that reduces the volume of the waste tires by at least 50 percent, or using an equivalent volume-reduction process that has received prior approval, in writing, from the secretary.

Natural disaster waste. The Unified Government Department of Emergency Management coordinates the activities in all phases of emergency management. The Department has developed a plan to addresses disaster mitigation, planning and preparedness, response to, and recovery from large scale emergencies and disasters. The current contract with Waste Management includes collection and disposal of vegetative storm debris generated from natural disasters.

Non-hazardous industrial process waste. Non-hazardous industrial process waste is disposed of in Subtitle-D landfills. Quantities and type of this material disposed is recorded and reported by the facility.

11.3 Options

Options were only developed for HHW related materials and not for the other smaller quantity wastes reviewed in this section.

Household Hazardous Waste. The structure of an HHW collection program can take many different forms including, but not limited to, the options described below, or a hybrid of these options:

- **Permanent facility (current service):** A community may own and/or operate a permanent facility that provides regular (monthly to multiple times per week) drop-off opportunities to residents. Ideally, a facility is centrally located within the service area (city or county), though convenient location for all customers is often challenging. This is currently Wyandotte County's program model hosting monthly collection events at a permitted facility, staffed by employees, contracting with a licensed company for material processing.

- **Periodic collection events:** Collection events are held in a community at designated intervals. Typically, a community selects an event location and contracts with a licensed company for proper processing and disposal of material.
- **Mobile collection**: A mobile vehicle or trailer with appropriate safety features (e.g., ventilation, explosion-proof, and material separation) may be owned by a community and staffed full or part time by trained personnel. This allows added flexibility with varied collection locations and more frequent collection opportunities and is lower-cost than a permanent facility. Material processing and disposal is typically contracted by a licensed company.
- **At-your-door collection (regular or on-call):** A community may choose to provide at-your-door HHW collection service as part of its curbside MSW services. This is a convenient option for customers but is often the most expensive program option on a cost per household basis.

Small quantities of hazardous waste. The county could provide a small quantity generator program to accept qualifying materials from businesses for a fee.

11.4 Recommendations

Based on the current system review, implementation of previous solid waste management plans, and an evaluation of options, the following recommendations are being made pertaining to the household hazardous waste sector.

1. **Continue monthly collection events.** In the immediate future, the County should continue to provide monthly collection events. It is important that residents continue to be provided with options for proper disposal of HHW materials. Monthly collection events may be replaced in the future by an alternative program if it is in the residents' and County's best interest.
2. **Consider more frequent hours of operation.** If financially feasible, consider expanding service to include weekly service hours of operation year-round with a permanent facility and staffing.
3. **Grant funding opportunities**. Additionally, the County should explore options to secure grant funding from the Kansas Department of Health and Environment to offset program costs.

No further recommendations are being made at this time pertaining to other waste discussed in Section 11.2 based on their limited quantity and County involvement.

12.0 PUBLIC EDUCATION & OUTREACH

Providing effective public education and outreach to residents is critical for the ongoing success of the County's solid waste management system. Guidance and support from the County can shape proper participation and positive program engagement experiences for residents which increases customer satisfaction and enables progress toward the County's goals. This section describes key points of customer engagement, potential methods for communication, key messaging, and strategies and recommendations.

12.1 Current System Review

The Unified Government has provided education and outreach on various topics of waste reduction, recycling, and composting. The messaging is typically broad in topic unless the messaging is geared toward promoting a time-specific event. A variety of communication methods have been utilized to promote the messaging.

Website. Through its website, the County provides detailed current information as a resource for residents regarding the types of services provided, types of materials accepted with each service, guidance for participation, and service schedules.

Newsletters. Information is distributed through local print and online periodicals including the Livable Neighborhoods Newsletter, Livable Neighborhoods E-Newsletter and in the Unified Government E-Newsletter. The Unified Government's E-Newsletter is published each Tuesday and has a distribution of approximately 3,000. The Livable Neighborhood Task Force newsletter is printed off for neighborhood groups monthly. There are over 5,000 copies printed each month.

Social media. The County utilizes its social media channels periodically to provide residents with information and reminders about topics such as service delays and special collection events.

Educational programming. Wyandotte County has networked with the Mr. & Mrs. F.L. Schlagle Library in Kansas City, Kansas for numerous years. They are one of two environmental libraries in the United States. They provide recycling-related programs to area schools. Additionally, Wyandotte County Extension provides numerous composting classes each year reaching thousands of participants.

12.2 Key Categories of Communication

There are two primary categories of customer engagement for residential MSW services. These include initial education and outreach for new programs and changes to existing programs as well as ongoing communications, and both are critical for long-term success the County's MSW management system.

1. **Initial Education and Outreach.** There are several programmatic changes included in this Plan that the County may consider implementing. If key or substantial changes to services result from the Plan, it would require that the County develop education and outreach plans specific to each program. When existing services change or new services are implemented, it is the County's responsibility to provide adequate education, guidance, and resources to enable residents and the County to transition successfully. Outreach and education should begin prior to implementation and should continue through a specified transition period after initial implementation. The appropriate length of a transition period will depend on the specific changes being made to the MSW system.
2. **Ongoing Communications**. In addition to developing specific, targeted public education and outreach plans for program changes, the County should ensure it has an effective plan for ongoing customer communications. Ongoing, regular communications will help to maintain strong customer engagement and proper participation habits and is important for long-term system success. Residents should have access to key information about services (e.g., collection times, collection days, accepted materials) when they need it, in the form of an up-to-date, clear website and an accessible customer service telephone number. Easy access to information will support proper participation and customer satisfaction. The County may use other methods to deliver periodic communications as needed, such as direct mail, email, flyers, etc.

12.3 Options

There are numerous public education and outreach methods the County could employ, some of which the County already successfully utilizes. The most effective and appropriate outreach methods will depend on the specific objectives of each communication. The methods chosen should be determined through consideration of factors such as target audience (typically all single-family residents), timeline, available funding, specific program or service, complexity of issues (initial outreach or ongoing outreach).

Collaborate with partners. It is important that the County collaborate closely with other appropriate entities to develop and execute outreach efficiently and effectively. Primary partners for public education and outreach include:

- **Contractors.** Cities should work with their contractor to ensure that proper participation instruction is communicated to residents. The contractor may have prior experience regarding successful participation behaviors and behaviors that may present challenges for residents or the County (such as set-out guidelines).
- **UG's Public Relations.** The Unified Government's Public Relations Department is a key internal resource that has existing public communication channels. The department has experience conducting public education and outreach for community services, events, and news. They produce and distribute newsletters and the content for the Unified Government TV station as well as manage the Unified Government's social media pages. They can provide guidance regarding successful communication methods and best practices and should collaborate on development and implementation of education and outreach initiatives.

Outreach methods. The specific education and outreach methods the County chooses to utilize will depend on the purpose of the communication. Some methods may be effective for many communication objectives, while other objectives may require more specialized methods or messaging. For example, it is best practice to update the UG's website on a regular basis, for all service changes or reminders, so that residents may use it as a reliable source of information. Specific or significant program changes often require more specialized, direct customer outreach as well as broad communications. The more direct contact the county and the cities have with residents, the more effective public education and outreach typically will be. It is often necessary to utilized multiple methods to effectively communicate with residents.

Potential public education and outreach methods include, but are not limited to

- Booths at public events
- Cart tags
- County Commission communications
- Direct mail
- Email
- Flyers public spaces
- Mobile app
- Press releases
- Public meetings or workshops
- Short videos online or at public events
- Social media
- Unified Government TV
- Municipal websites
- Utility bill inserts

12.4 Effective Messaging

The most effective customer communications have several characteristics in common:

- **Clear and simple.** Language should be direct and concise while also friendly and engaging. The Unified Government should define the primary focal points for program information and communicate them in a concise manner. Graphics-based communications should be utilized as much as possible.
- **Consistent.** Consistency in language and graphics is important to support clear customer understanding and proper program participation. Standardized language, instructions, and graphics should be used across communication pertaining to all types of services and should be consistent over time.

12.5 Recommendations

Based on the current system review, implementation of previous solid waste management plans, and an evaluation of options, the following recommendations are being made pertaining to the residential sector.

1. **Continue current public education and outreach efforts.** Countyand city governments should continue their current public education and outreach efforts.

2. **Commit resources.** The Unified Government should allocate resources and staff to support the Solid Waste Division on the communication and outreach efforts.

3. **Utilize clear, simple, consistent messaging.** The county and cities should utilize clear, simple language for all communications and employ use of graphic-based messaging where possible. Language, graphics, and information provided should be consistent across all outreach methods and all service types. Consistency will allow for the highest opportunity for proper, regular, and convenient participation in MSW management by residents.

4. **Leverage existing resources and partnerships.** Utilize communication methods already developed such as website, newsletters, social media, emails and Unified Government TV. Work with service contractor to distribute consistent messaging.

APPENDIX A - IMPLEMENTATION PLAN

	ID	Recommendation	Priority	Timeframe	Key Action Items and Notes	Responsible Party
Facilities	4.1	Collection Services: Consider and evaluate municipally provided residential MSW services	Low	Long-term	To be evaluated 3-4 years prior to end of current collection contract.	
	4.2	Transfer Station: consider and evaluate municipal facility	Low	Long-term	The role of transfer stations may grow as regional landfill capacity decreases.	
	4.3	Organics Processing Facility: consider and evaluate a municipal facility	High	Near-term	Evaluate sources and quantities of organic materials generated within the County and potential locations for the development of infrastructure. Consider public-private partnerships.	
Residential Refuse	5.1	Transition to county-wide cart-based refuse service.	Low	Long-term	To be evaluated 3-4 years prior to end of current collection contract. Planning and procurement of carts including zoning and code changes. A variance would need to be allowed for residents where carts are not practical.	PW, attorney, consultant
	5.2	Provide additional services: bulky item, yard trimmings			See sections below	
Residential Recycling	6.1	Provide all customers with a collection container	High	Near-term	As part of the current contract with WM, all customers pay for recycling service but have not yet received a collection container.	PW, service provider
	6.2	Transition to county-wide cart-based recycling service.	Medium	Near to mid-term	Planning and procurement of carts including zoning and code changes. A variance would need to be allowed for residents where carts are not practical.	PW, attorney, consultant
	6.3	Consider every other week collection frequency	Low	Long-term	During the next procurement process, seek bids for a variety of service frequencies including weekly and every other week. Every other week collection is most likely less costly than weekly collection and may allow for additional services on alternating weeks.	PW, Purchasing, consultant
Bulky Item	7.1	Reduce bulky item collection frequency				PW, attorney, consultant

	ID	Recommendation	Priority	Timeframe	Key Action Items and Notes	Responsible Party
	7.2	Provide separate bulky item collection		Long-term	Procure service in next bid procurement process. Request a variety of options including collection monthly, quarterly, and call-in.	PW, Purchasing, consultant
	7.3	Investigate opportunities for bulky item drop-off	Medium	Mid-term	Consider including requirements to allow residents to drop off bulky items through contract service agreements and special use permits at solid waste facilities (i.e., Republic Transfer Station). Consider adding bulky item drop-off to the Unified Government Recycling and Yard Waste Facility.	PW, Business License
Yard Trimmings	8.1	Provide separate yard trimmings collection	High	Long-term	Procure service in next bid procurement process. Request a variety of options including collection weekly, every other week, monthly, and seasonally. Likely a minimal to moderate cost increase.	PW, Purchasing, consultant
	8.2	Continue to consider long-term potential for food scraps diversion	Low	Long-term	Consider food scraps diversion, depending on development of markets, local processing options, and residential demand.	PW
Commercial/Multifamily	9.1	License commercial haulers and require as a provision to report waste and diversion tonnages	Medium	Mid-term	Develop an ordinance that requires haulers to become licensed through County and report the amount of refuse, recyclables, and/or organics collected on an annual basis.	PW, Business License
	9.2	Business license requirement to provide for solid waste services	High	Near-term	Require as a provision of the current business licensing program that waste removal services are provided. Enforcement can be added to the Building Inspection which is already a function of the License Division's process.	PW, Business License
	9.3	Provide education and outreach	Low	Mid to Long-term	Where staffing is available, a free technical assistance program could work with businesses to identify ways that participation can be increased where diversion and recycling options exist.	PW
C&D	10	Lead by example: adopt an ordinance for county funded projects to require a minimum standard of C&D recycling and use of recycled materials	Low	Long-term	This could be an adoption of LEED standards for all County projects.	PW, attorney
HHW	11	Continue monthly collection events	High	Near-term	Annual program costs will remain comparable to recent years.	PW
	11	Explore opportunities to increase service frequency	Medium	Long-term	The County already has the infrastructure with a permanent HHW Facility. Increasing collection days would incur costs for staff and material disposal.	PW

	ID	Recommendation	Priority	Timeframe	Key Action Items and Notes	Responsible Party
	11	Explore grant funding opportunities through KDHE	Medium	Near-term	KDHE offers annual grants for HHW programs looking to expand programs and services.	PW
Education and Outreach	12	Continue current public education and outreach efforts	Medium	Ongoing	Hire or designate staff to focus on efforts.	PW
	12	Utilize clear, simple, consistent messaging	High	Ongoing		PW
	12	Utilize existing resources when possible	Medium	Ongoing	Local and national organizations offer material for public use (MARC, Resource Recycling, etc.) which may reduce costs associated with developing original public education materials. Extend outreach through community partnerships and service provider.	PW, service provider

APPENDIX B – SUPPORTING PLAN INFORMATION

APPENDIX B – SUPPORTING PLAN INFORMATION

Soils

The latest soil survey of Wyandotte County, Kansas was conducted by the US Department of Agriculture Soil Conservation Service in cooperation with the Kansas Agricultural Experiment Station published in 1977. The full report is attached and describes the acreage and proportionate extent of the soils in the County (See Attachment 1).

Geology and Hydrogeology

The following description was obtained from the Jewett and Newell, "The geology of Wyandotte County, Kansas: Kansas Geological Survey" [40]:

> The topographic features of Wyandotte County are produced by the two major streams, Missouri and Kansas rivers, and their tributaries, the surface being deeply dissected. The rocks of this region, as in adjoining parts of the state, consist of beds of limestone, shale, and sandstone, dipping gently to the northwest. The relief is not unlike that of adjacent areas, the maximum difference of elevation being approximately 320 feet, ranging from less than 740 feet above sea level at Missouri river on the east to about 1,060 feet on the upland of the western part. of the county. The stream pattern is typically a dendritic one, with occasionally a suggestion of a trellis pattern in the tributaries of Kansas river. The course of Kansas river across the county appears to be controlled largely by the attitude of the underlying rocks, as can be seen by referring to the accompanying structural map of Wyandotte County.
>
> The land surface consists of rolling upland occupying the divide between the two rivers, and a relatively large area occupied by the stream valleys. The county lies just within the boundary of the Glaciated Plains and presents the topographic features of early maturity, modified but slightly by the Pleistocene glaciation.
>
> Part of the uplands are modified by thick deposits of loess and drift, especially in the eastern and northern parts of the county adjoining Missouri river, where the surface presents the rolling aspect typical of many loess-covered regions.
>
> The exposed strata control the configuration of the valley walls, the limestone beds forming terraces and the shale beds producing more or less gentle slopes. In general, the distinct benches

[40] Jewett, J.M., and Newell, N.D., 1935, The geology of Wyandotte County, Kansas: Kansas Geological Survey, Bulletin 21, pt. 2, pp. 151-205.

are formed by the Dennis, Westerville, Drum, Argentine (in particular), Plattsburg and Stanton limestones. The remainder of the limestone and sandstone beds are either too thin or not sufficiently resistant to produce distinct terraces.

In a few places alluvial terraces occur along tributaries of Kansas and Missouri rivers, principally along those of Kansas river. The tributaries to Missouri river within the area are relatively short and have correspondingly high gradients. The streams following into Kansas river may be divided into two categories, those having a low gradient, a wide open valley, and a broad plain; and those having a relatively high gradient, narrow, steep valley, and no flood plain. Streams of the former class include Big Stranger creek, Wolf creek, and Little Turkey creek on the north side of Kansas river, and Wakarusa creek, Kill creek, Cedar creek and Mill creek on the south side of the river. These streams have terraced valley walls in places and wide flood plains, into which in some cases' the streams are now actively cutting. Kill creek, for example, near De Soto, Johnson County, is now cutting its bed for a considerable distance in solid rock, whereas the alluvial terraces indicate that the valley was previously filled to a considerable depth and is now being excavated again.

Climate and Rainfall

Climate in Wyandotte County is typical of the humid continental Midwestern United States. Summers are hot and humid with mild nights; falls are mild with cool nights; winters are cold. Spring can bring frequent weather changes with severe storms possible. Average temperatures in January are a high of 38 F and low of 18 F. Average temperatures in July are a high of 89 and a low of 66.[41]

Average annual precipitation is comprised of about 34 inches of and 20 inches of snow. Nearly two-thirds of the precipitation falls between May and August. Winters are generally dry.

Transportation

Wyandotte County is served by five Interstate highways: I-70, I-35, I-670, I-635, and I-435; and five designated US federal highway routes: 24, 40, 69, 73, and 169. Three Kansas State highway routes traverse the county: K-5, K-7, and K-32. There is a total of over 1,300 miles of federal, state, and local

[41] U.S. Climate Data. www.usclimatedata.com.

roads in the county. Three major railroads ─ Burlington Northern-Santa Fe, Union Pacific, and Southern Pacific─ operate on a total of about 285 miles of tracks (including all rail yards and main lines).[42]

Air Pollution

The Wyandotte County Air Quality Program is responsible for operating an extensive ambient air quality monitoring network. This program monitors the ambient levels of pollutants such as ozone (O3), carbon monoxide (CO), sulfur dioxide (SO2), nitrogen oxides (NOx) and particulate matter (PM). It also operates a complex weather station. Federal health levels, or National Ambient Air Quality Standards (NAAQS), are set for each of six major pollutants. This program monitors these six pollutants to ensure that their levels do not increase above the NAAQS. Wyandotte County coordinates closely with the Mid America Regional Council and the other state and local agencies in the region to ensure that good data is collected and reported.

The greater Kansas City metropolitan area has struggled for decades to maintain attainment with the ozone pollution standards. The State of Kansas developed a State Implementation Plan for achieving attainment and a regional effort has been ongoing.

Sewage

Wyandotte County and its municipalities are responsible for the safe collection, transportation, and treatment of wastewater generated by residential, industrial, and commercial customers. They provide wastewater and stormwater services for residents across Wyandotte County which includes the maintenance and operation of wastewater and stormwater sewers, six wastewater treatment plants, wastewater pump stations, flood pump stations, miles of flood control levees. The wastewater system is made up of both combined and separate sewer systems.

Water Resources and Public Water Supply

The majority of Wyandotte County water services are provided by the Kansas City Board of Public Utilities (BPU), a not-for-profit municipal utility. BPU serves over 51,000 water customers in a service area of approximately 152 square miles. This service area includes Kansas City, Kansas, Edwardsville, southern Leavenworth County, parts of Bonner Springs and a small section of northern Johnson County. BPU's state-of-the art water system has the capacity to pump 72 million gallons of water a day (MGD),

[42] Unified Government of Wyandotte County/Kansas City, KS, GeoSpatial Services, "Wyandotte County, KS Geographic Fact Sheet" 2014.

including one water treatment facility; three major pump stations; 1,000 miles of water pipes and two of the nation's largest horizontal collector wells.[43]

BPU's water comes from the Missouri River watershed, which represents nearly one-sixth of the area of the continental United States. The Missouri River carries runoff from predominantly rural, non-industrialized regions. BPU water is collected and filtered through two horizontal collector wells in an aquifer deep below the Missouri River.

Before this "raw" water turns into drinking water, it is cleaned, treated and tested at BPU's Nearman Water Treatment Plant. The plant opened in 2000 and offers the latest treatment and technology methods available. Once the water meets or surpasses all regulations, it is then distributed through underground pipes to customers.

Local and Regional Land-Use Development Plans

Each municipality in the County oversees a local planning department responsible for land use planning. The Unified Government Planning and Urban Design Department has developed a variety of comprehensive planning documents. The mission of the department is to enhance the long-term value and livability of Wyandotte County through the design of a regenerative community that is socially just, economically accessible, culturally diverse and environmentally sustainable.

The Plans and resources are available on the County website and include the following:

City-Wide Master Plan
Area Plans
Community Plans
Historical surveys and resources

Additionally, the Mid-America Regional Council develops regional plans for the Kansas City Metropolitan Area which includes Wyandotte County and eight other local counties. One of the recent land-use development plans include the Regional Plan for Sustainable Development, updated in March 2014, which is a compilation of key regional plans and strategies with common goals and themes.[44]

[43] Kansas City Board of Public Utilities, www.bpu.com.
[44] Mid-America Regional Council website: http://www.marc.org/Regional-Planning/Creating-Sustainable-Places/Plans/Regional-Plan-for-Sustainable-Development

APPENDIX C - SALVAGE YARDS

Burns & McDonnell World Headquarters
9400 Ward Parkway
Kansas City, MO 64114
O 816-333-9400
F 816-333-3690
www.burnsmcd.com

Burns & McDonnell World Headquarters
9400 Ward Parkway
Kansas City, MO 64114
O 816-333-9400
F 816-333-3690
www.burnsmcd.com

BURNS McDONNELL

CREATE AMAZING.

Burns & McDonnell World Headquarters
9400 Ward Parkway
Kansas City, MO 64114
O 816-333-9400
F 816-333-3690
www.burnsmcd.com