SCS ENGINEERS

# Solid Waste Master Plan and Rate Study

Presented to:

**City of Killeen, Texas**
Solid Waste Division
2003 Little Nolan Road
Killeen, TX 76541
(254) 501-7785

Presented by:

**SCS ENGINEERS**
1901 Central Drive, Suite 550
Bedford, Texas 75043
(817) 571-2288

February 2015
File No. 16214052.00

**Offices Nationwide**
**www.scsengineers.com**

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# Acronyms and Abbreviations

| | |
|---|---|
| C&D | Construction and demolition debris |
| CNG | Compressed natural gas |
| CPI | Consumer price index |
| CTCOG | Central Texas Council of Governments |
| DGE | Diesel-gallon equivalent |
| FTE | Full-time equipment |
| FY | Fiscal year |
| GCC | Government capital corporation |
| HHW | Hazardous household waste |
| KKB | Keep Killeen beautiful |
| KRC | Killeen recycling center |
| LNG | Liquefied natural gas |
| MF | Multi-family |
| MRF | Materials recovery facility |
| MSW | Municipal solid waste |
| OCC | Old Corrugated Cardboard |
| Plan | Solid Waste Master Plan and Rate Study |
| ROI | Return-on-investment |
| SCS | SCS Engineers |
| sf | Square feet |
| SWEO | Solid waste enforcement officer |
| TAC | Texas Administrative Code |
| TCEQ | Texas Commission on Environmental Quality |
| USEPA | United States Environmental Protection Agency |
| WCID | Bell County Water Control & Improvement District, No. 1 |

# 1.0 EXECUTIVE SUMMARY

## 1.1 PLAN OVERVIEW

The City of Killeen Solid Waste Master Plan and Rate Study (Plan) is a detailed review of the City's current solid waste programs, including a brief history of how the City progressed to the current system. It includes a detailed description and assessment of the current solid waste system and services provided. The Plan establishes broad goals and objectives to improve the system during the planning period. The Plan presents an analysis of alternative scenarios for future management of solid waste, including options for waste diversion and recycling programs designed to achieve significant waste diversion.

The solid waste alternatives are developed into scenarios that are modeled using pro-forma economic analyses and presented as part of the rate study at the end of this Plan. The rate study compares the scenarios and provides rate recommendations for the next five years. Finally, the Plan provides recommendations and a suggested implementation schedule for the recommended improvements. The Plan provides the City with a roadmap for the continued improvement and sustainability of the solid waste system that serves the citizens and businesses within the City of Killeen.

## 1.2 PLAN GOALS

The intent of the Plan is to establish the foundation for long-term management of solid waste in the City of Killeen. The Plan's goals and objectives are described in the plan and summarized here:

- Goal #1: Continue to provide cost-effective and convenient solid waste programs to customers that promote and maintain a high level of satisfaction and meet the needs of the community at a reasonable cost.

- Goal #2: Increase waste diversion and recycling rates in a cost effective manner to reduce the amount of solid waste that is transferred for disposal.

- Goal #3: Encourage and expand coordination and communications regarding solid waste issues among local Central Texas cities and Fort Hood.

- Goal #4: Provide for long term transfer and disposal operations that are cost effective to the customers.

Objectives for achieving these goals are presented in Section 4.

## 1.3 CURRENT SOLID WASTE SYSTEM

The City of Killeen Solid Waste Division has 93 employees that provide a wide range of services to Killeen residents and commercial customers. The collection division provides residential and commercial collection services to approximately 46,000 residences and 1,723 commercial accounts. The division also provides special collection services including brush, bulky waste

and yard waste. Curbside recycling services are offered on a subscription basis for $2.48 per month. This service costs approximately $10 per customer to operate and diverts approximately 600 tons of materials annually. The total amount of material recycled annually is approximately 1,600 tons with an additional 4,000 tons of brush diverted from the waste stream. The City also hosts special collection events including household hazardous waste (HHW). The City processes 95,000 tons of solid waste through a transfer station that is hauled to the City of Temple Landfill for disposal. The current transfer station began operation in 2007 and provides a location for citizens and businesses to self-haul waste and recyclables.

## 1.4 PLAN RECOMMENDATIONS

The following recommendations are presented as a result of the analysis of alternative scenarios and assessment of needs for the solid waste system.

- Recommendation #1: Develop and implement an equipment replacement plan to replace and maintain the solid waste fleet for improved performance and reduced maintenance costs.

- Recommendation #2: End the curbside subscription recycling service and reallocate resources to improve the efficiency of the City's recycling programs.

- Recommendation #3: Consider adding curbside collection of recyclables to the entire City and further evaluate the development of a materials recovery facility (MRF) to be jointly developed and operated by the City and Fort Hood with additional participation by other local governments.

- Recommendation #4: Consider adding curbside collection of yard wastes to the existing system to be delivered to the Bell County Water Control and Improvement District (WCID) composting facility for processing.

- Recommendation #5: Consider increasing the City's commercial recycling efforts to capture a larger percentage of paper and metals that are generated within the City and divert these to existing recycling operations to provide additional revenue.

## 1.5 RATE MODEL RECOMMENDATIONS

In order to meet the Division's anticipated revenue requirements, SCS recommends the following:

- That the City move forward with implementing both a residential and commercial customer fee adjustment beginning in Fiscal Year 2014/2015. This rate increase will enable the Division to have sufficient revenues to meet anticipated fleet replacement needs, as well as helping meet increased operating costs.

- That the City should increase its special service and administrative fees by 5 percent and adjust these based on the Consumer Price Index (CPI) to address the Division's cost of providing these services.

- Based on the Division's overall objective of implementing the best value, single-stream recycling program Citywide; implementing a MRF project with Fort Hood (Scenario #3) appears the most feasible of all three MRF scenarios evaluated. More detailed cost estimating work will need to be accomplished should the City implement this option. Further, the roles and responsibilities of both parties will need to be more clearly delineated and agreed upon.

- Rates in subsequent years should be annually increased for both residential and commercial customers by the CPI for the Killeen region. This will enable the Division to meet projected increases in operating costs.

- The Division's actual expenses for services should be reviewed annually to assess whether an additional rate increase is warranted for extraordinary Division expenses. At a minimum, the Division should secure the services of an independent rate consultant in the next three to five years to reassess the Division's operational expenses and projected revenues.

# 2.0 INTRODUCTION

## 2.1 PLANNING PURPOSE

The City of Killeen authorized SCS Engineers to develop a 20-year solid waste master plan that reviews existing programs and addresses future needs during the planning period. Part of this effort includes a rate analysis of existing programs as well as a comparative analysis of potential scenarios for future solid waste programs.

## 2.2 PLANNING HISTORY

This Plan is the first solid waste master plan prepared for the City that comprehensively reviews and assesses the City's existing systems and develops plan recommendations for the future. Previous planning efforts have been performed by City staff through internal communications and processes. The Killeen Vision 2030 established a goal of developing a solid waste master plan for the City. The City last completed a solid waste rate study in 2009.

## 2.3 ORGANIZATION

This Plan is organized into three main components. The first component includes Sections 1-3, containing the executive summary, background information, and solid waste data. The second component includes Sections 4 and 5 - the goals, objectives, and overview and analysis of the existing solid waste system. The third component consists of the alternative analysis and rate study that includes recommendations for the future solid waste system in Sections 6-10.

## 2.4 PARTICIPANTS

The City of Killeen Solid Waste Division staff provided data and input into the Plan along with review and comment throughout the development of the Plan. SCS Engineers developed the Plan recommendations as well as all the pro-forma economic analysis.

A meeting was held at the City that included participants from Fort Hood and surrounding communities including Harker Heights and Copperas Cove. The meeting was an initial planning-level discussion regarding the potential for a regional MRF for the City, Fort Hood, and area cities.

Additional meetings were held with City staff to discuss plan issues and preliminary findings.

## 2.5 COORDINATION WITH REGIONAL PLANNING EFFORTS

The Plan conforms to State guidelines for local solid waste plans. Killeen is a member City in the Central Texas planning region. The solid waste plan for this region is periodically updated by the Central Texas Council of Governments. After adoption of this Plan, it is recommended that the City inform the regional planning authority regarding future planning efforts that may impact future regional planning updates. The City of Killeen is also a member of the Centex Sustainable Communities Partnership that includes Fort Hood, Copperas Cove, Harker Heights, and Gatesville. The planning effort included coordination with these entities.

## 2.6 FEDERAL, STATE, AND LOCAL RULES AND REGULATIONS

The United States Environmental Protection Agency (USEPA) promulgated rules that established federal requirements for the design and operation of municipal solid waste (MSW) landfills in 1991. These rules, referred to as Subtitle D, set forth new requirements for liners, monitoring of groundwater and other operational standards. This set in motion a series of events in state regulatory agencies around the nation that led ultimately to a large reduction in the number of municipal landfills within the states including Texas. The State of Texas adopted these rules in 1993, and the City of Killeen closed their existing municipal landfill shortly thereafter to avoid the impact of these rules.

The regulation of municipal solid waste in Texas is addressed in the Texas Health and Safety Code in Title 5, Chapters 361 and 363. These chapters address solid waste disposal and municipal solid waste management issues including planning, funding and management of solid waste. The Texas Commission on Environmental Quality (TCEQ) regulates the collection storage, transportation, processing and disposal of municipal solid waste (MSW) through the Texas Administrative Code (TAC), Chapter 30. MSW rules are contained primarily in the following subchapters:

Chapter 328: Waste Minimization and Recycling - These rules address the establishment of recycling processing facilities as well as other types of waste minimization including tire reclamation. The City of Killeen Recycling Center did not require registration or permitting under this rule due to the exemption for municipalities that operate recycling facilities.

Chapter 330: Municipal Solid Waste - The MSW rules under this chapter address the permitting, registration, and operation of MSW facilities that store, process and dispose of MSW. These rules cover landfills, transfer stations, and liquid waste processing facilities in addition to other lesser used types of MSW facilities.

The City of Killeen operates a municipal solid waste transfer station that is registered to operate under the Chapter 330 rules that govern the establishment and operation of MSW transfer stations within the existing limits of a permitted MSW landfill.

Chapter 332: Composting - The composting rules establish the requirements to permit, construct and operate composting operations. The approval process includes a tiered system, which is based on the types of materials accepted for processing. The Bell County WCID composting facility, which is located adjacent to the City's transfer station, is a "registration tier" facility. This facility is approved to accept wastewater treatment plant biosolids in addition to a variety of source-separated organic wastes, including yard waste. This type of facility does not have permission to receive mixed municipal solid wastes.

# 3.0 POPULATION AND WASTE PROJECTIONS

## 3.1 POPULATION PROJECTIONS

The City of Killeen is located in the Killeen Temple Metropolitan Service Area (MSA), which has a population estimated to be 420,000 based on the 2012 census estimates. This is the 7th largest MSA in the state. Killeen and the surrounding Central Texas region is expected to experience continued steady growth through the 20-year planning period due to presence of Fort Hood and proximity to the Austin Metropolitan area.

Projected population annual growth rates for the City of Killeen were taken from the City of Killeen's 2012 Water and Wastewater Master Plan prepared by Freese and Nichols, Inc. The projected population growths rates varied between 1.3% - 1.9%, from Table 2-2 Population Projections. Using the specific average annual growth rate and the 2012 population of 131,474 as a starting point, SCS calculated population projections through 2034. Exhibit 1 shows the estimated population projections as well as the average annual growth rates.

**Exhibit 1. Killeen Population Projections**

| Year | Population Projection | Average Annual Growth Rate |
|---|---|---|
| 2012 | 131,474 | - |
| 2013 | 133,183 | 1.30% |
| 2014 | 134,915 | 1.30% |
| 2015 | 136,668 | 1.30% |
| 2016 | 138,445 | 1.30% |
| 2017 | 140,245 | 1.30% |
| 2018 | 142,489 | 1.60% |
| 2019 | 144,769 | 1.60% |
| 2020 | 147,085 | 1.60% |
| 2021 | 149,438 | 1.60% |
| 2022 | 151,829 | 1.60% |
| 2023 | 154,714 | 1.90% |

| Year | Population Projection | Average Annual Growth Rate |
|---|---|---|
| 2024 | 157,654 | 1.90% |
| 2025 | 160,649 | 1.90% |
| 2026 | 163,701 | 1.90% |
| 2027 | 166,812 | 1.90% |
| 2028 | 169,981 | 1.90% |
| 2029 | 173,211 | 1.90% |
| 2030 | 176,502 | 1.90% |
| 2031 | 179,855 | 1.90% |
| 2032 | 183,273 | 1.90% |
| 2033 | 186,755 | 1.90% |
| 2034 | 190,303 | 1.90% |

[1] Average annual growth rates for the City of Killeen were taken from the City of Killeen's 2012 Water and Wastewater Master Plan prepared by Freese and Nichols, Inc.

## 3.2 WASTE QUANTITIES AND COMPOSITION

SCS estimates a 2014 solid waste disposal rate of 95,000 tons based upon the amount of waste received and processed at the City's Transfer Station. In addition to this tonnage, the City recycled approximately 1,600 tons of materials received at the Killeen Recycling Center (KRC) and the transfer station. The City also diverted 4,900 tons of brush to the Bell County WCID #1 composting facility located next to the transfer station.

In order to provide a general breakdown of the City's waste stream, since a detailed waste-sort was not conducted as part of this effort, SCS used data from USEPA, TCEQ, and other SCS studies. This information is shown in Exhibits 2-5. The assumed general breakdown utilized is as follows: Residential – 52%; Commercial – 40%; Construction and Demolition Debris (C&D) – 8%

**Exhibit 2. U.S. Waste Generated Composition (USEPA 2010)**

| Material | Waste Generated U.S. EPA 2010 |
|---|---|
| **Paper** | 28.54% |
| **Glass** | 4.61% |
| **Metals** | |
| Ferrous | 6.76% |
| Aluminum | 1.36% |
| Other Non-Ferrous | 0.84% |
| ***Total Metal*** | *8.97%* |
| **Plastics** | 12.42% |
| **Rubber and Leather** | 3.11% |
| **Textiles** | 5.25% |
| **Wood** | 6.36% |
| **Other Materials** | 1.92% |
| **Other Wastes** | |
| Food | 13.91% |
| Yard Trimmings | 13.37% |
| Inorganic Waste | 1.54% |
| ***Total Other Wastes*** | *28.82%* |
| **TOTAL** | **100.00%** |

**Exhibit 3. Types and Amounts of MSW Landfilled in Texas in 2013 (TCEQ)**

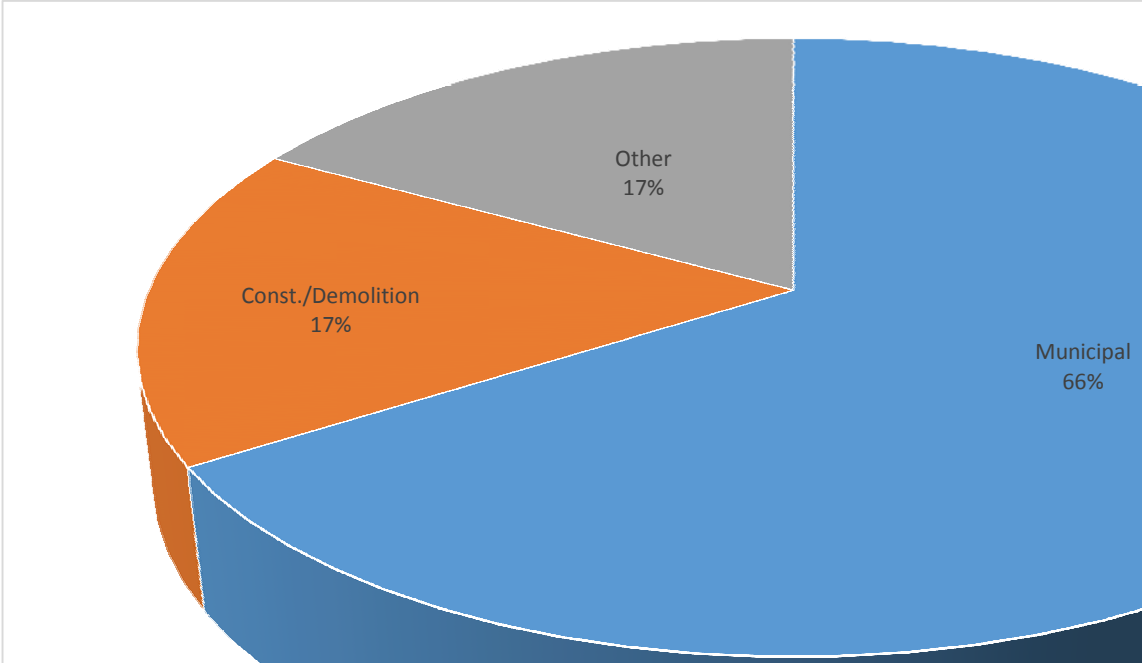



**Exhibit 4. Types and Amounts of MSW Landfilled or Diverted in Texas in 2013 (TCEQ)**

| Waste Type | Tons | % Tons |
|---|---|---|
| **Landfilled** | | |
| Municipal | 20,044,610 | 66% |
| Construction/Demolition | 5,334,017 | 17% |
| Other | 5,191,114 | 17% |
| ***Total Landfilled*** | ***30,569,741*** | ***96%*** |
| **Diverted** | | |
| Yard Waste or Brush | 396,780 | 31% |
| Metal | 53,739 | 4% |
| Plastics | 10,176 | 1% |
| Construction/Demolition | 312,881 | 24% |
| Paper/Cardboard | 128,136 | 10% |
| Other | 389,527 | 30% |
| ***Total Diverted*** | ***1,291,239*** | ***4%*** |
| **TOTAL** | **31,860,980** | **-** |

## Exhibit 5. Estimated Average Single-Family Waste Composition (SCS Study from 13 Municipalities)

| Material Components | | Average Residential Composition | Average Residential Tonnage (Killeen, 2012) |
|---|---|---|---|
| Recyclable Curbside | Corrugated Cardboard | 2.5% | 2,348 |
| | Newspaper/Print | 2.5% | 2,380 |
| | Office/Mixed Paper | 10.8% | 10,265 |
| | PET Bottles | 1.8% | 1,670 |
| | HDPE Bottles | 1.0% | 976 |
| | Other Plastic Containers | 1.8% | 1,710 |
| | Ferrous Metal | 2.3% | 2,221 |
| | Aluminum | 1.1% | 999 |
| | Other Non-Ferrous Metal | 0.5% | 513 |
| | Glass Bottles/Jar | 3.3% | 3,173 |
| | **Subtotal Recyclable Curbside** | **27.6%** | **26,256** |
| Other Recyclable | Gable Top Cartons/Aseptic | 0.7% | 699 |
| | Scrap Metal | 1.5% | 1,433 |
| | Plastic Shopping Bags | 1.0% | 984 |
| | Textiles/Carpet | 5.1% | 4,841 |
| | Electronics | 1.2% | 1,171 |
| | C&D | 3.9% | 3,745 |
| | HHW | 0.2% | 201 |
| | **Subtotal Other Recyclable** | **13.8%** | **13,074** |
| Compostable | Food | 15.8% | 15,049 |
| | Yard Waste | 5.4% | 5,092 |
| | Other Paper | 10.6% | 10,032 |
| | **Subtotal Compostable** | **31.8%** | **30,173** |
| **Total Recyclable** | | **73.2%** | **69,503** |
| **Total Non-Divertible** | | **26.8%** | **25,497** |
| | **TOTAL** | **100.0%** | **95,000** |

# 4.0 KEY ISSUES, GOALS, AND OBJECTIVES

## 4.1 EXISTING SOLID WASTE SYSTEM AND FACILITIES

### 4.1.1 Facilities

The City of Killeen solid waste management system includes several facilities that serve as key components to the overall program. The following facilities are owned and maintained by the City of Killeen:

- Solid Waste Transfer Station;
- Administrative Offices;
- Killeen Recycling Center;
- Equipment and Container Storage Yard;
- Container Maintenance Shop;
- Old Transfer Station Facility; and
- Closed MSW Landfill.

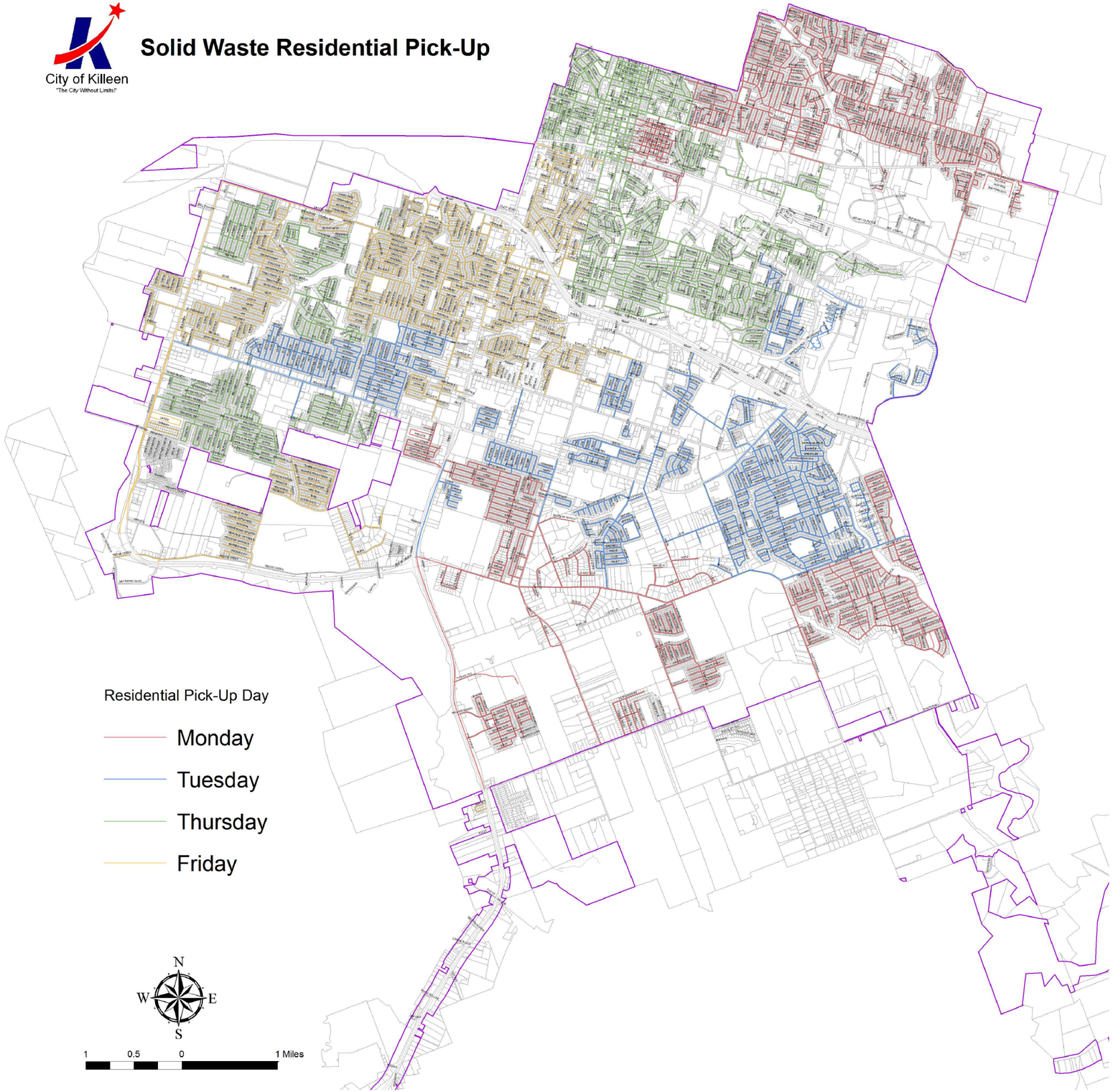
### 4.1.2 Collection

City crews provide residential and commercial solid waste collection services. The City is currently divided into four geographical areas; serving about 46,000 residential customers. Each of these four areas has an assigned garbage collection day: Monday, Tuesday, Thursday, or Friday (Exhibit 6). Customers can choose from 96-gallon, 64-gallon, or 32-gallon, wheeled containers. Pickup is provided using automated equipment that grasps the container, and lifts and empties the container into the collection truck. The Division also provides once a week collection of brush (up to six cubic yards), and bagged yard waste in bags. Additional fees are imposed on the utility billing to account for volumes above these limits, as well as bulky waste items (e.g., furniture, white goods or appliances).

The Division also provides collection services for about 1,700 commercial customers. A variety of containers are provided as well as different pickup schedules based on the need of the business or institution.

City of Killeen
"The City Without Limits!"

# Solid Waste Residential Pick-Up




SOURCE: CITY OF KILLEEN

**EXHIBIT 6**
**DIVISION MAP OF RESIDENTIAL ROUTES**
**SCS ENGINEERS**

### 4.1.3 Recycling

The Division has an active curbside recycling program as well as operating the KRC. Currently, the curbside program includes roughly 3,500 homes who voluntarily subscribe to the program, paying an additional $2.48 per month surcharge on their monthly utilities bill for this service. Each resident is provided a 22-gallon container for plastic bottles, paper products, glass bottles, and steel or aluminum cans. In addition to items included in the curbside collection program, the KRC accepts additional materials such as: sheet metal, iron, steel, appliances, lead acid batteries, rechargeable batteries, motor oil, oil filters, and antifreeze.

The Division also participates in an annual regional household hazardous waste collection event where residents of the City as well as neighboring municipalities can drop-off these materials for free during the event. There are also other Citywide recycling events sponsored over the year by Keep Killeen Beautiful and Fort Hood.

### 4.1.4 Transfer and Disposal

Transfer station operations include the receipt and processing of solid waste from the City's residential and commercial routes, as well as self-hauled waste from individual customers. The transfer station processes approximately 95,000 tons of solid waste annually based on the most recent data. At the transfer station, solid waste is consolidated and loaded into long haul transfer trailers that can carry approximately 20 tons per haul. Waste is hauled to the City of Temple landfill for final disposal. The transfer station began operation in 2007. The City-owned facility operates with approximately 15 full-time personnel. The City contracts with a private hauling company and landfill to transport and dispose of the City's waste.

## 4.2 KEY PLANNING ISSUES

At the outset of the planning effort, SCS and the City met to review current solid waste programs and activities. Exhibit 7 summarizes some of the significant planning issues discussed, related considerations, and alternatives for enhancing the current solid waste system.

**Exhibit 7. Key Planning Issues**

| Issue | Key Items / Considerations | Alternatives to Enhance System |
|---|---|---|
| 1. Solid Waste Collection | Fleet is older than recommended resulting in increased maintenance and performance issues.<br><br>Size of fleet and current routing may need to be re-evaluated in the near future.<br><br>Container maintenance is a challenge with current facilities.<br><br>Loss of revenue due to temporary roll-off containers. | Develop a fleet replacement plan that will update and maintain the fleet, improving performance and decreasing maintenance costs.<br><br>Perform a route optimization study and audit of equipment to determine appropriate levels of equipment for the system in 2 – 3 years.<br><br>Consider use of old transfer station as a container maintenance facility.<br><br>Review State/local ordinances to determine if franchise fees are applicable. |
| 2. Recycling Program | Low recycling rate and high cost of operation relative to material recovered. | Expand current programs and recovery with new initiatives or phase out the current program as new recycling programs are implemented. |
| 3. Curbside Recycling | City has limited subscription service that is costing more than the program charges. | Replace subscription service with new recycling program that is consistent with goals and objectives. |
| 4. Household Hazardous Waste Collection | Current program costs $50,000 per year. | Evaluate alternate collection and disposal options. |
| 5. Commercial Recycling | Amount of material recycled is very limited but revenue from this waste stream offers potential to increase diversion with small amount of capital. | Review existing programs and assess the demand for additional recycling of specific high-value materials. |
| 6. Multi-Family Collection and Recycling Issues | Currently no multi-family recycling services. | Consider developing citizen convenience centers in proximity to high density, multi-family (MF) areas. |
| 7. Yard/Brush Wastes | Diversion of yard waste from transfer station is limited to brush. | Meet with Bell County WCID to discuss potential for enhanced yard waste diversion and possibly wood waste. |

| Issue | Key Items / Considerations | Alternatives to Enhance System |
|---|---|---|
| 8. Code Enforcement | Continued challenge to the City to police and monitor.<br><br>Customers set-out non-City provided cans. Cans are often overfilled. | Fund a Solid Waste Enforcement Officer (SWEO).<br><br>Increase enforcement resources for tagging customers for non-compliance with City ordinance, and delinquent account collections. |
| 9. Transfer Station | Transfer station has excess capacity permitting partial utilization of tipping floor to divert materials. | Explore increasing diversion of materials from the waste stream at the transfer station. |
| 10. Landfill Operating Life | The City of Temple Landfill has 10 – 15 years of remaining site life. Other landfill location would result in increased haul and disposal rates. | Increase diversion rates to coincide with higher cost to dispose of waste in later stages of the planning period. Higher costs may make other options more desirable such as diversion of C&D waste. |
| 11. Alternative Waste Conversion Technologies | Landfill costs are low relative to waste conversion technologies; some technology is still emerging and unproven. | Continue to monitor projects and technology. |

## 4.3 PLAN VISION, GOALS, AND OBJECTIVES

### 4.3.1 The Vision

The City of Killeen continues to support and refine the vision and goals for managing solid waste. The vision for the 2014-2034 planning period supports a solid waste management system serving residents, businesses and other customers within the City that:

- Provides the maximum opportunity for economically practical waste reduction, reuse, and recycling using appropriate incentives, disincentives, and policies to motivate residents, businesses, and institutions.
- Ensures the availability of economical, long-term MSW transfer and disposal capacity.
- Maintains an efficient system for collection, diversion, transfer, and delivery of solid waste streams.
- Offers a convenient method for residents to recycle a wide variety of marketable materials.

- Communicates easily understood information regarding opportunities for all residents to reduce and recycle waste.

- Employs effective methods to improve the solid waste services to each customer in a cost effective manner with a high level of quality.

- Is supported by a secure and equitable funding system to cover the costs of the current and future solid waste management programs, as outlined in this plan and demonstrated in the rate study.

- Realizes increased efficiencies and cost savings through good cost accounting policies and procedures.

### 4.3.2 Goals and Objectives

The intent of the Plan is to establish the foundation for long-term management of solid waste in the City of Killeen. The Plan's goals and objectives are described in the following paragraphs:

**Goal #1: Continue to provide cost-effective and convenient solid waste programs to customers that promote and maintain a high level of satisfaction and meet the needs of the community at a reasonable cost.**

Objectives:

- Review existing collection programs and implement improvements to improve efficiency and quality of service to customers.

- Maintain sufficient funding mechanisms to support solid waste programs.

- Ensure compliance with Federal, State, and local solid waste laws, regulations, and ordinances.

- Evaluate new technologies and processes that may improve current programs and services thereby achieving greater efficiency of solid waste operations.

- Review and update ordinances that address solid waste services to address new and enhanced solid waste programs. These should incorporate recommended rate increase.

**Goal #2: Increase waste diversion and recycling rates in a cost effective manner to reduce the amount of solid waste that is transferred for disposal.**

Objectives:

- Make measurable and steady progress in a cost effective manner towards reducing the percentage of the City's solid waste that is hauled for landfill disposal from the Transfer Station.

- Ensure convenient access to collection or drop-off services for residences, businesses, and industry.

- Assess alternatives for cost effective and convenient collection and diversion of yard waste from transfer and disposal operations.

- Evaluate various options for curbside collection and processing of recyclables and implement a program consistent with the City's vision of cost effective service.

**Goal #3: Encourage and expand coordination and communications regarding solid waste issues among Central Texas cities and Fort Hood.**

Objectives:

- Increase public awareness of solid waste issues by continuing and expanding educational opportunities within the City to promote waste reduction and recycling options.

- Encourage public involvement in the Plan's planning and implementation process.

- Encourage coordination and communications in solid waste issues among jurisdictions and governmental entities in the Central Texas region including Fort Hood.

- Provide an ongoing mechanism for evaluation and feedback of the City's solid waste management system.

- Identify opportunities to partner with Fort Hood and other entities where cost effective on solid waste programs to benefit the region.

**Goal #4: Provide for long term transfer and disposal operations that are cost effective to the customers.**

Objectives:

- Evaluate current transfer station operations and recommend improvements to improve efficiency and cost effectiveness of transfer operations.

- Identify potential opportunities for increased revenue for the transfer station if excess capacity is available.

- Ensure that transfer station operations will continue to keep pace with the anticipated growth of the City and changes to the solid waste stream.

# 5.0 CURRENT SOLID WASTE SYSTEM REVIEW AND ANALYSIS

This section provides an overview and analysis of the City's current solid waste management system and programs.

## 5.1 ADMINISTRATION

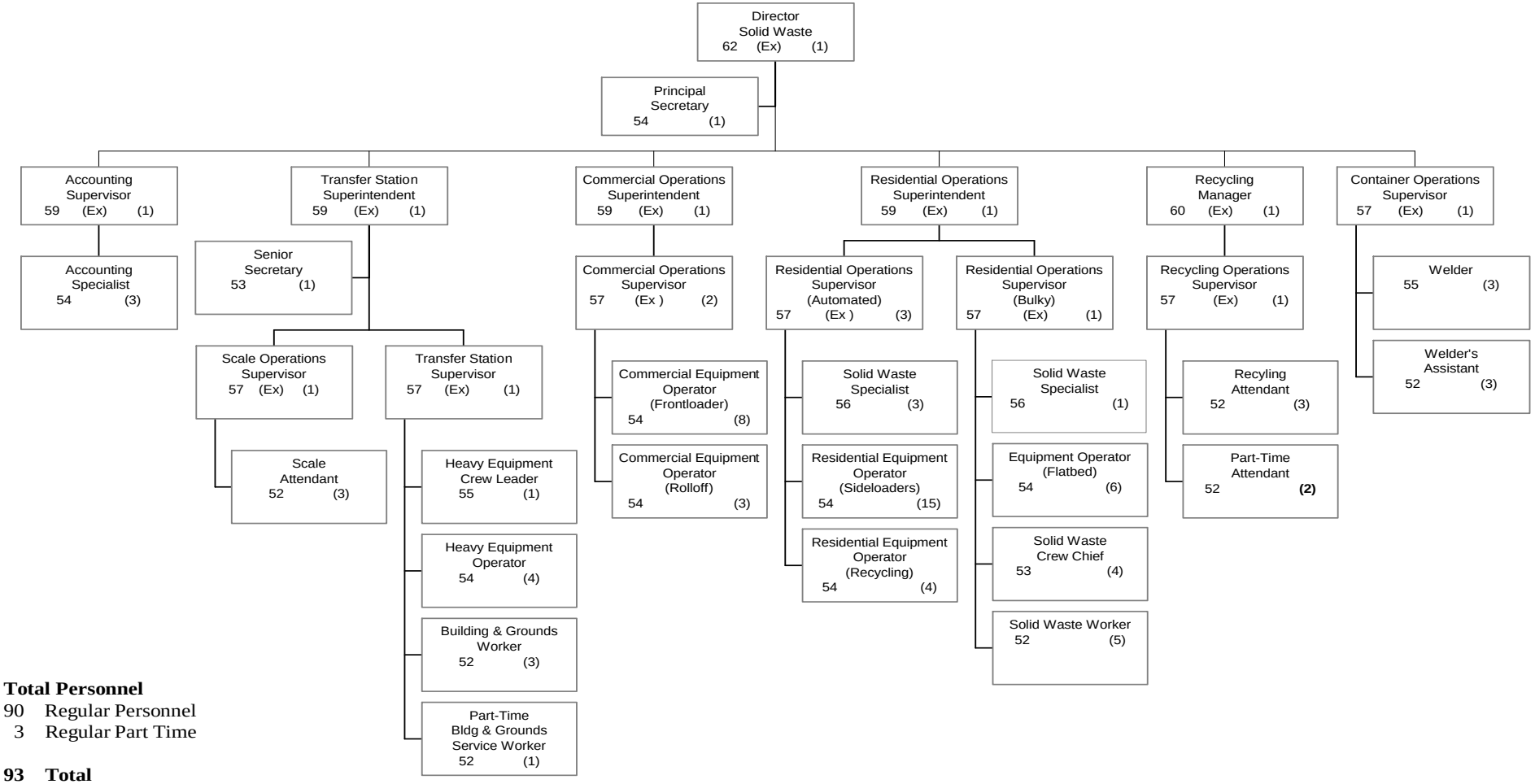
Exhibit 8 provides the current organizational chart of the Solid Waste Services Division within the City's Public Works Department. For Fiscal Year 2014/2015, the City has funded a total of 90 full-time equivalent positions (FTEs) and three part-time FTEs for a total of 93 employees. The FTE positions are categorized as follows:

- Administration – 2;
- Accounting – 4;
- Transfer Station – 16;
- Commercial Services – 14;
- Residential Services – 43;
- Recycling – 7; and
- Container Repair – 7.

**Exhibit 8. Division Organizational Chart**

# SOLID WASTE SERVICES

## CURRENT ORGANIZATIONAL CHART
## AS OF 02/24/2014




**Total Personnel**

90 Regular Personnel
3 Regular Part Time

**93 Total**

## 5.2 WASTE COLLECTION PROGRAM

The City currently provides solid waste collection services to approximately 46,000 residential and 1,700 commercial customers, respectively (Exhibit 9).

**Exhibit 9. Summary of Division Services and Resources**

| Services | Accounts | Staff | Routes | Equipment |
|---|---|---|---|---|
| Residential | 46,000 | 2 – Administration<br>4 – Accounting<br>43 – Residential<br>21– Commercial<br>7 – Recycling<br>16 - Transfer | – Side-Loader Routes<br>– Rear-Loader Routes<br>– Front-Loader Routes<br>– Grapple Truck<br>– Roll-Off Truck (On Call) | 15 – Automated Side Loaders (3 )<br>4 – Rear-Loaders (1 )<br>7 – Front-End Loaders (2)<br>6 – Grapple Trucks (1)<br>4 – Roll Off Trucks (1)<br>2 – Recycle Trucks |
| Commercial | 1,723 | | | |

( ) Spares

### 5.2.1 Residential

The Division currently provides once a week collection for 46,000 customers within the City. Customers can choose from 96-gallon, 64-gallon, or 32-gallon containers. These residential customers are serviced using 12 automated side-loader routes (Exhibit 10). Nearly 90 percent of the containers serviced are the 96-gallon type. The City allows customers to change their cart size. Unlike many other municipalities offering a single-cart size, this practice requires the City to have a significant cart size inventory at all times resulting to increased costs and inefficiencies.

**Exhibit 10. Automated Side Loader Vehicles**

### 5.2.2 Bulky Wastes and Yard Waste

Currently, the City charges for pickup of bulky and yard wastes placed curbside (Exhibit 11). In April 2013, the City initiated a new free bulk waste clean-up program, which expanded on the City's traditional fall cleanup program, which has been provided by the City at no cost to its residents. This is the first time the City has held free bulk trash pickup in the spring, in addition to its normal fall pickup and holiday bulk pickups. The impetus for introducing a second bulk trash pickup for the year began with a City beautification effort initiated by the Killeen City Council in the summer called Killeen Up! This new program entitles residents to free bulk waste pickup of bulky trash, such as brush, furniture, appliances, boxes and tires from residents' curbs. The annual costs of these programs vary depending on the participation rate and volumes of materials collected. Typical costs per event are in the range of $50,000.

**Exhibit 11. Division Bulk Waste Pickup**

### 5.2.3 Commercial

Division crews provide commercial collection services for apartments including some four-plexes, institutions, and businesses. The Division uses front-end loaders (Exhibit 12) to service the different sized, metal dumpsters containing these wastes. Currently, the Division has roughly 1,700 accounts throughout the City, including approximately 80 City buildings.

**Exhibit 12. Front-End Vehicles**

The Division also provides roll-off collection service (Exhibit 13). A large majority of the Division accounts are fee-for-service, although the Division provides roll-offs to not-for-profit (501c3) organizations. The Division also provides some of these services to Killeen residences for Spring Clean Up, costing approximately $50,000 per year. Roll-off containers are large, open-top containers used primarily on construction sites to place construction and demolition debris. The roll-off containers are available (by volume) in 20 cubic yard, and 30 cubic yard volume sizes.

**Exhibit 13. Division Roll-Off Vehicles**

### 5.2.4 Equipment Inventory Replacement

#### 5.2.4.1 Maintenance

Division equipment is maintained by the Fleet Services Division, which performs these services to all City-owned vehicles and equipment. The Division budgets an annual expenditure for maintenance of all equipment based on the current age and size of the fleet and maintenance costs from recent years. As the division initiates a new equipment replacement plan, the annual maintenance costs should be closely monitored to determine the effectiveness of the new plan on maintenance costs.

#### 5.2.4.2 Equipment Inventory Replacement Options

The Division's most recent Fleet Replacement Schedule is included in Appendix A of this report. The City currently allots roughly $500,000 in annual budget funds by the City to purchase and replace residential and commercial fleet vehicles. Pursuant to the results of a previous rate study, these funds are generated by a one dollar fee that is included in the base solid waste rate for residential and commercial customers. This level of funding only enables the Division to replace a few vehicles per year. That being said, a significant portion of the Division's current fleet inventory is well past its prime, requiring a high level of maintenance to ensure that there is sufficient fleet for daily collections. As a point of comparison, "best-in-class" solid waste agencies across the United States generally aim for the following replacement schedules:

- Side-loaders and front-loaders – six to seven years;

- Rear-loaders and roll-off vehicles – seven to eight years; and
- Bulk pick-up and container trucks – 10 years.

In order to lower its average fleet life to these fleet replacement benchmarks, SCS recommends that the Division will initially need a one-time purchase of eight or more vehicles to its fleet. Further, SCS recommends that the Division's fleet replacement funding should be increased annually by $100,000 over the next a five-year period so that at the end of that period annual fleet funding is approximately $1 million. An enhanced fleet replacement scenario was developed in the accompanying rate study (Section 10) to analyze the rate impact of this level of vehicle funding.

### 5.2.5 Route Optimization

#### 5.2.5.1 Overview

Because equipment costs, labor, and fuel are significant operating expenses for solid waste collection; reducing the number of routes, labor hours, and mileage through route optimization is a critical and straightforward approach to increasing efficiency and reducing costs. However, route optimization is not simple. Waste routing software is typically complex to implement and has a high rate of failed implementations by municipalities (i.e., the software was too complicated to be adopted into daily operations). Routing is extremely complex, requiring multiple types of routing software algorithms.

It is SCS' experience that there is not one software application on the market that handles all types of waste routing effectively. Multiple applications would need to be implemented to service all types of waste collection routing. To assess whether the City should consider implementing waste route optimization software, the following questions should be answered:

- Do the crews have assigned route boundaries?
- Is each route mapped?
- Was the last re-route more than five years ago?
- Are the number of stops and containers known for each individual route?
- Were the current routes developed based on all of the factors of time, weight, number of load drops, and the number of collection stops?
- How long should each route take to complete on a typical day?

If the answer is "no" to any of these questions, it is highly likely that the City's operation could benefit from route optimization. Given the high cost of operating a truck each year (exceeding $20,000), it does not require a significant improvement in waste collection efficiency to reach a return on investment (ROI) in only a few months.

#### 5.2.5.2 Pitfalls of Route Planning Software Implementations for Waste Collections

As noted previously, routing projects are highly complex. For residential waste collection, there are typically thousands of customers that must be geolocated on the map. Further, productivity rates vary amongst different types of vehicles, in different types of streets and neighborhoods,

and with different types of customers. For instance, there are oftentimes maneuver restrictions on certain roads and reduced speeds around schools or heavy traffic areas.

The complexity can seem insurmountable, but route optimization software applications reduce complexity and make it easy to make routes, change routes, and generate maps and report outputs. Nonetheless, the approaches are complex to initially configure and setup, and are problematic to maintain in order to keep the data up-to-date.

Many municipal operations assign a route supervisor to learn and use the software, the Route Supervisor that manually created routes in the past. However, the supervisor may not have the technical background or experience in implementing a complex software application. By contrast, an IT staffer with limited knowledge of solid waste operations may also be an issue.

Although there are not any studies quantifying the effectiveness of solid waste routing software implementations, it is SCS' experience that more than half of the residential curbside waste routing projects end up in the customer not continuing to use the waste routing software on an on-going basis. The project provides an initial set of routes that are implemented and then the software is hardly used again. It is for this reason that many municipalities hire a consultant or bid out the work to a routing software company that is highly experienced with the various routing applications to develop the routes for them.

#### 5.2.5.3 Division Experience in Routing

The City is currently evaluating RouteWare as part of a pilot project for 10 commercial and light-duty collection vehicles. The pilot system consists of a combination of on-board computing, GPS, and back-office software. The objective is to prove how the Division can optimize routes, track driver field activity, and manage costs, as well as eliminate missed pick-ups.

### 5.2.6 Container Maintenance

The Division operates a container maintenance shop (Exhibit 14) to service its commercial dumpsters and residential carts. Division staff is assigned traditional welding and repair duties to ensure adequate inventory is available for residential as well as commercial customers.

**Exhibit 14. Container Maintenance Shop**

### 5.2.7 Code Enforcement

The City has historically had a dedicated person or personnel to address code enforcement issues related to collection. SCS recommends that the City consider recreating this position to improve performance and capture lost revenue.

### 5.2.8 Change in Vehicle Fuels

In recent years, a variety of new fueling technologies have entered the solid waste collection marketplace. Solid waste collection vehicles have abysmal fuel efficiency, typically around three miles per gallon. So, municipal fleet managers and their counterparts, in private companies like Waste Management and Republic Services, are buying thousands of new natural gas and hybrid hydraulic vehicles. Natural gas trucks can save on fuel costs, but the upfront costs for fueling stations and upgrades to fleet maintenance facilities to prevent stray sparks from igniting an explosion are significant. The trucks themselves can also cost $30,000 more than their basic diesel counterparts. But the savings for natural gas vehicles can add up quickly. Natural gas prices have plummeted since the widespread use of hydraulic fracking, which has unlocked huge reserves of natural gas supplies throughout the United States. This section provides a brief overview of the current state of these technologies, an overview of communities who have become “early adopters,” and some advantages and disadvantages for consideration by the City.

#### 5.2.8.1 Hybrid Technology

With fuel costs rapidly escalating over the last several years, vehicle manufacturers like Toyota have been quite successful in launching products like the Prius with gasoline-electric hybrid engines to boost fuel economy. Over the past few years, engine manufacturers for waste collection equipment have developed diesel engine designs with extensive post-combustion control and advanced-combustion control to meet the stringent diesel standards mandated by the Federal Clean Air Act. Even more advanced systems are planned in the upcoming years as the Federal diesel standards become even more stringent. All of these design changes have resulted in increasing purchase and operating costs for diesel solid waste collection trucks.

Typically, a normal solid waste collection vehicle can service upwards of a thousand stops per day on a route, and oftentimes stop-and-go hundreds of times. Approximately 75 percent of an average garbage truck’s duty cycle is spent on collecting refuse with the balance used to transport the waste to the ultimate disposal point. Each time the vehicle is started, a large amount of fuel is consumed to get the vehicle back to operating speed. Further, when the brakes are applied to slow or stop the vehicle, energy is lost as heat. Typically, 40 to 50 percent of the fuel used to collect refuse is used to generate all of the truck's hydraulic needs. All of the energy needs for a typical diesel, solid waste collection truck commonly equate to an average fuel consumption of roughly two to three miles per gallon.

Current regenerative braking systems employed on passenger hybrid cars like the Prius and other popular domestic hybrids store the kinetic energy from braking as electric energy in specially designed battery packs, which are then used to power an electric engine that is installed in the vehicle. Can these hybrid technologies find their way into the municipal waste collection systems? We are happy to report that this day is not far-off.

One of the most exciting hybrid technologies is focused on using what is called hydraulic regenerative braking. As opposed to the technology used by the Prius and other popular hybrids to convert the energy produced by braking into electrical energy, hydraulic regenerative braking recovers energy and stores it as high-pressure hydraulic fluid in a pair of tanks (an accumulator) that is built into a vehicle's drive train. During the braking process, the energy produced by the vehicle's brakes is used to pump the hydraulic fluid from the reservoir into a second tank. There, as the second tank fills with the fluid, the gas is compressed, allowing the energy to be stored. Then during vehicle acceleration, the high-pressure hydraulic fluid is fed back through the pump, which then supplies additional torque so that the engine has to work less and use less fuel. Recent research suggests that this specially designed hybrid hydraulic system captures nearly 70 percent of the vehicle's braking energy. This is an added advantage for refuse trucks, which need an additional boost of power during sudden starts and stops.

In 2010, a prototype of this new type of vehicle manufactured by a consortium of Parker Hannifin and Autocar, using the hydraulic hybrid technology known as RunWise, was provided to Miami-Dade County, Florida. The goal was to help the hybrid system manufacturer, Parker Hannifin, fine-tune its product before launching it into mass production. The perfect place to test it out was in Dade County, home to one of the largest municipal solid waste fleets in the United States (a 193-truck fleet servicing 340,000 homes per day). The single test truck was enough to convince the County's Fleet Manager to purchase additional hybrid vehicles over the next four years for a total of 64 as of this writing. Based on this experience, dozens of cities around the United States (e.g., Orlando, Florida, Chicago, Illinois, Austin, Texas, and Tacoma, Washington) have also purchased three hybrid refuse vehicles in recent years, a few with grant funds available under the National Diesel Funding Assistance Program.

So far, these solid waste agencies report a savings of about 33 percent over traditional diesel-powered solid waste collection vehicles. This amounts to average annual fuel savings of about $8,000 to $10,000 per year per vehicle. The hybrid vehicles are reported to cost in the range of $350,000 to $400,000, which is about 25 percent more than traditional solid waste collection models. Fleet managers report that the hybrid vehicles require less maintenance. For example, brake pads seem to last longer because the brakes typically do not come into contact with the brake drums until the truck slows to about two miles per hour. Normally, brakes for diesel refuse trucks are replaced by most fleet operations every four to five months, but the brakes on hybrid vehicles may need to be changed every six years. Further, vehicle truck tires appear to last longer as well due to reduced friction heat on the wheels. Lastly, an added benefit in fuel reduction and reduced maintenance is that it improves air quality and supports many community climate action plans goals to reduce greenhouse gas emissions.

Another exciting hybrid technology for refuse collection application has been developed by Oshkosh, named the ProPlus Hybrid Electric Drive. Instead of having a mechanical drive train, it utilizes a diesel engine that powers an electric generator, which in turn powers electric motors that run the vehicle's wheels. This design effectively eliminates the need for a transmission, torque converter, transfer case, and drive shaft. Lastly, the design does not utilize batteries to store electricity, but instead uses "ultra capacitors." Recent results published by Oshkosh suggest fuel savings of 40 percent over conventional diesel refuse trucks.

Following a trial of a single hybrid-electric solid waste collection truck manufactured by a consortium of Volvo, Mack, and Bosch, the New York City Department of Sanitation has taken delivery of five more. These trucks have 325-horsepower Mack MP7 diesel engines used for its TerraPro, low entry vehicles with a 630-volt, liquid-cooled lithium ion battery for energy storage. These pilot vehicles are reported to show fuel efficiency by about 30 percent as compared with vehicles powered solely by a diesel engine. As of this writing no additional operating data and results are available.

#### 5.2.8.2 Natural Gas

Two current significant trends in solid waste management are the transition by waste haulers and municipalities of their collection fleets from diesel to compressed natural gas (CNG) or liquefied natural gas (LNG) fuels, and an investment in natural gas fueling stations. Waste collection vehicle manufacturers report that within the last three years, more than half of their new vehicle sales include those designed to burn CNG or LNG.

The reasons for the conversion from diesel fuel to natural gas include a variety of economic, environmental, and political considerations. Foremost among these is that natural gas produced in the United States appears to be the lowest cost alternative fuel source. Depending on geographic location and proximity to gas lines, the average price of natural gas today can cost $1.50 to $2.00 less per diesel gallon equivalent (DGE). Projections from government, corporate, and non-profit agencies suggest that natural gas will continue to be plentiful and relatively cheap compared to diesel fuel over the planning horizon of this master plan.

Typical refuse truck fuel use averages between 8,500 to 10,000 gallons per year at an average fuel efficiency of 2.5 to 3 gallons per mile, thus, the growing differential between natural gas and diesel fuel. Solid waste haulers can save as much as 30 to 50 percent on fuel costs. What was once prompted by environmentalism due to the promulgation by United States Environmental Protection Agency (USEPA) of new restrictive federal heavy-vehicle emission regulations has now been largely driven by the promise of significant long-term fuel savings.

Several of the major waste hauling firms in the United States such as Waste Management, Inc., Republic Services, Inc., and Progressive Waste Solutions have already made capital replacement plans to replace their existing diesel-fuel refuse collection vehicles with natural gas vehicles as they are scheduled for replacement. A few municipalities as well are entering the arena as “early adopters” on this wave to natural gas. The most important issues involving this emerging trend in solid waste collection are included in the following pages.

#### 5.2.8.3 How Is It Dispensed?

CNG is dispensed either through a time-fill, quick-fill station, or combination time-fill and quick-fill. A time-fill station slowly fills the vehicle fleet over an extended period (8 to 12 hours). A quick-fill station performs similar to a normal diesel or gasoline pump. The number of vehicles, the filling frequency, and the total quantity of fuel to be dispensed during the filling period is used to size the facility compression and storage components.

Time-fill (also known as slow-fill) fueling is usually recommended for solid waste fleets that utilize onsite fueling with vehicles that return to a central location for a period of six to eight

hours, during which they can be refueled. Many solid waste operators use time-fill fueling because the fueling station equipment required is often the least expensive. Exhibit 15 is an example of a "portable" time-fill CNG station.

The major components of a typical time-fill natural gas fueling station include:

- Compressor; and
- Time-fill Dispensers.

Using time-fill, vehicles refuel more slowly and therefore receive gas directly from the compressor through special time-fill dispensers. This eliminates the need for a high-pressure storage system. Time-fill fueling stations are available in a variety of sizes to meet all kinds of customer needs, including the vehicle refueling appliance that can fuel vehicles at home or at a business.

**Exhibit 15. Time-Fill CNG Station**

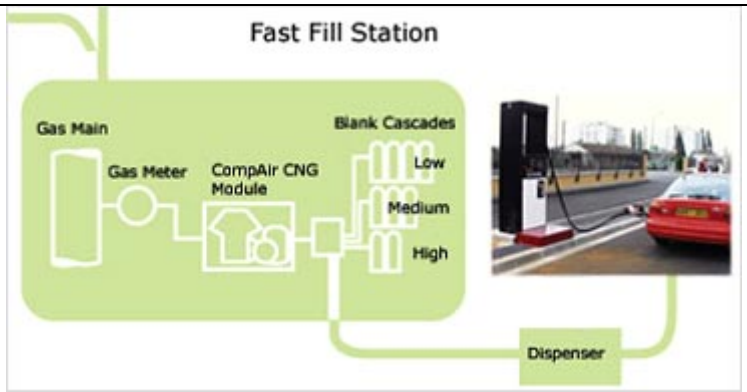
Source: TruStar Energy, 2014

Quick-fill (also known as fast-fill) is usually used when vehicles must be refueled in a time period similar to that of other conventional fuels, approximately three to seven minutes for automobiles and light-duty trucks. All public natural gas fueling stations are quick-fill.

The major components of a typical quick-fill natural gas fueling station include (Exhibit 16):

- Compressor;
- High-pressure storage;
- Gas reservoirs;
- Gas dryer;
- Expansion tank; and
- Quick-fill dispenser(s).

**Exhibit 16. CNG Quick-Fill Station**




Source: Natural Gas Vehicles (NGV) http://ngv.ie/station.htm 2007

At a quick-fill fueling station, natural gas is compressed by the compressor and stored in the high-pressure storage system. The compressor of a fuel station receives natural gas from a connection pipe. After drying (removing any condensate and impurities), gas is pressurized in several compression stages to 30 Mpa (4,350 psi). Compressed natural gas is stored in high-pressure reservoirs.

#### 5.2.8.4 What Do CNG Vehicles Cost?

Typical natural gas refuse collection trucks typically range in cost between $210,000 to $250,000; some 15 to 25 percent more expensive than comparable diesel-fuel vehicles. The American Trucking Association reports that natural gas trucks sell at a large premium ($45,000 - $75,000) compared to diesel-powered heavy duty Class 8 trucks. The primary reason for the increased cost is their more expensive engine and complex fuel system.

#### 5.2.8.5 CNG Vehicle Maintenance Experiences

Many operators report that maintenance costs for CNG vehicles are about the same as that for diesel vehicles. However, maintenance costs for natural gas refuse trucks can also be higher when a fleet is largely composed of diesel trucks, because of additional training requirements for technicians and duplication of maintenance equipment.

If a fleet has both diesel and CNG vehicles and equipment, separate maintenance facilities or areas are required for CNG and diesel vehicles because of different maintenance protocols and building code requirements for the two fuel types. When an entire fleet is replaced with CNG, more efficiency of equipment and personnel can be realized. Several features that must be incorporated into a CNG maintenance area are summarized below:

- Installation of a high-powered ventilation system that quickly removes gas from the area in case of gas line leaks or ruptures.

- The ventilation system must work in concert with an advanced combustible gas detection system that engages when fumes reach a certain level.

- All emergency HVAC, electrical, and mechanical systems must be designed to be "explosion proof."

- The design of the building must also incorporate the conversion of existing maintenance bays to support CNG vehicles, erecting a firewall to separate that area from the diesel bays.

## 5.3 TRANSFER AND DISPOSAL

### 5.3.1 Transfer Station Operations

The City of Killeen established a municipal transfer station in 1994 to provide a more efficient method of transporting waste from the City to a regional landfill (Exhibit 17). The City had ceased landfill operations that year in order to avoid the costly upgrade of the municipal landfill to comply with new regulations governing landfills. This facility, now referred to as the old transfer station, could not keep pace with the City's growth.

In 2005, the City initiated efforts to site, permit, and construct a new transfer station facility to serve the City's needs for the foreseeable future. That effort resulted in the current transfer station facilities that are located within the closed landfill boundary occupying approximately 10 acres of previously unused landfill property. The new transfer station was sized to accommodate an estimated 20 years or more of growth in the solid waste stream with no significant waste diversion programs. The current facility began operation in 2007 and received and processed approximately 95,000 tons of solid waste in the most recent fiscal year.

The facility consists of a 32,000 square foot (sf) transfer building with a 24,000 sf tipping floor. There are two drive-through truck tunnels for loading the transfer trailers via openings located in the tipping floor. The facility includes two remote controlled grapples that position and compact the waste in the open top trailers. The City operates the transfer station with 15 full time employees including the following positions:

1 Superintendent;
2 Supervisors;
5 Equipment operators;
3 Scale attendants;
3 Building and grounds workers;
1 Secretary; and
1 Part-time worker.

In addition to storage and loading of waste into the transfer trailers, the City performs a limited amount of materials recovery at the transfer station. Materials recovered include various metals as well as some cardboard.

A citizen's collection facility is located adjacent to the transfer building for the drop-off of recyclables.

The annual budget for transfer station operations is approximately $5,136,700. This includes $1,201,300 for operations and $3,935,400 for hauling and disposal. The Transfer Station Operations division also performs required annual maintenance on the closed MSW landfill that the City owns. This maintenance includes mowing and subsidence repairs as needed to provide adequate drainage and prevent ponding.

The City's transfer station staffing and operations appear to be adequate for the services the City currently provides and for the immediate future. The transfer station is sized to accommodate significant growth before an expansion will be needed. It is not anticipated that an expansion of the transfer station operation will be necessary during the 20-year planning period.

The transfer station tipping floor requires periodic maintenance due to routine wear of the surface. The last floor topping replacement occurred in 2011. The City should plan additional floor topping repairs every 5-7 years.

**Exhibit 17. Killeen Transfer Station**

### 5.3.2 Hauling and Disposal Contracts

The City of Killeen contracts with Waste Management for disposal and Comal for hauling from the transfer station to the City of Temple Landfill. The current contract will end in 2015. The City has recommended new rates and terms for renewal of the five-year agreement. The new rates would be $24.40 per ton for disposal and $268 per load for hauling. Disposal options for the City within the region are primarily limited to the City of Temple Landfill. This facility has a current remaining site life of approximately 13-14 years. Unless the facility is granted a permit to expand, the City could be faced with seeking disposal at an alternative disposal facility during later stages of the planning period. The agreement with Waste Management provides an alternative disposal site in Williamson County for a higher disposal rate.

## 5.4 RECYCLING PROGRAMS

The following section discusses the City's current recycling programs.

### 5.4.1 Subscription Curbside Collection

Currently, the City provides a voluntary, subscription curbside recycling collection program. This curbside recycling program started in 2001 and currently has about 3,500 subscribers who pay a monthly charge of $2.48. Subscribers are provided with a 22-gallon bin that is collected weekly by Division crews. Recent statistics collected by the Division indicate that the City diverted roughly 500 tons of recyclables annually from the City's transfer station. Recyclables collected curbside, by Division crews, are delivered to the City's recycling center and then transported to a local MRF.

The operational costs for this program exceed revenue because of inherent inefficiencies in manpower allocation and scheduling. It lacks the economies of scale oftentimes seen in larger scale curbside recycling programs. Based on SCS' analysis of the costs to operate this program and the current participation levels, we recommend the program be phased-out and that the City transition to more efficient and cost-effective methods of recycling and waste diversion. Additional recommendations regarding this transition are included in Section 9.

In recent years, the City has considered the possibility of partnering with Fort Hood and neighboring municipalities on a community-wide MRF or with a private vendor offering MRF processing capability. A request-for-proposals for these services was issued last year and several responses were received. As part of this Plan, a Charrette was conducted with Fort Hood and neighboring cities to assess the feasibility of a joint MRF project. Under both MRF operation options considered, the City would provide a citywide curbside recycling program. These two operating scenarios are modeled as part of the rate analysis for the Plan (see Section 10).

### 5.4.2 Citizen Collection Centers

The Division operates KRC, which accepts materials from the curbside recycling program and recyclable materials from the public as a drop off center (Exhibit 18). As shown, the KRC operates a baler, which compresses paper and plastic products for transport to Central Texas markets.

Exhibit 19 summarizes recyclable materials processed by the KRC (1,422 tons in FY 2013/2014. About 36 percent of this overall tonnage of recyclable commodities was generated by the Division's curbside collection program. The remaining tonnage is derived from materials diverted at the transfer station and drop-off centers.

**Exhibit 18. Killeen Recycling Center**

**Exhibit 19. KRC Recovered Tonnages, FY 2014**

| Materials | Tonnages |
|---|---|
| OCC | 438 |
| Other Paper | 328 |
| Metals | 318 |
| Plastics | 163 |
| Glass | 175 |
| Curbside Recycling Program | 510 |

### 5.4.3 Waste Reduction and Recycling Programs

The following paragraphs briefly summarize the City's waste reduction and recycling programs.

#### 5.4.3.1 HHW Collection Events

The City currently partners with the Central Texas Council of Governments (CTCOG) and area cities to host hazardous household waste (HHW) collection events. Residents can dispose of HHW materials, such as petroleum products, corrosives, fertilizers, cleaners, pesticides, paint, automotive liquids and fluorescent lamps. At these events, tires also are accepted for a minimum fee of $1 per tire. The City finds these events are useful in reducing the amount of potentially harmful chemicals placed into waste delivered to the Transfer Station. These HHW collection events are well attended each time they are held.

The most recent HHW event was held in February 2014 (Exhibit 20) and serviced 295 residents including 408 tires, 340 gallons of oil, 45 gallons of antifreeze, and 43 lead acid batteries. In addition to City residents, the event was open to residents of Bell, Coryell, Hamilton, Lampasas, Milam, Mills and San Saba Counties, the member counties of CTCOG.

**Exhibit 20. Killeen Household Hazardous Waste Event**

## 5.4.4 City Educational Programs

### 5.4.4.1 Public Educational Programs

The City and Division also participated in a number of communitywide, solid waste and recycling events (Exhibits 21 and 22). Last year's "Don't Mess with Texas Trash Off" event, which was held in April (Exhibit 21) had nearly 600 volunteers and collected nearly 8,500 pounds of litter along the City's right-of-way and public places.

**Exhibit 21. Annual "Don't Mess With Texas Trash Off" Event**

**Exhibit 22. Texas Recycles Day Flyer**

### 5.4.4.2 Private Educational Programs

Keep Killeen Beautiful (KKB) sponsors a number of communitywide educational events during the year. KKB is an affiliate of Keep America Beautiful and Keep Texas Beautiful. It participates in annual projects such as: Texas Recycles Day, Adopt-A-Roadside program, Don't Mess with Texas Trash Off, Texas Arbor Day, Make a Difference Day Projects, GIS Day, Earth Day, Christmas Tree Recycling, and other eco-related projects.

For the past 21 years, KKB has sponsored the Annual Christmas Tree Recycling Day in partnership with the City and Fort Hood (Exhibit 23). The program allows residents to mulch their used trees and wreaths, so they can either take home the wood chips or donate the mulch to Killeen's Parks and Recreation Division.

**Exhibit 23. Killeen Christmas Tree Recycling**

## 5.5 ACCOUNTING SERVICES

The Accounting Section of the Solid Waste Division has 4 full-time employees and is responsible for maintaining accurate financial records for the Solid Waste Fund in compliance with the City's fiscal policies and procedures. Accounting personnel process accounts payable, accounts receivable, assimilate data, and prepare various financial reports. The Accounting section also provides customer service support for the Solid Waste Division and handles approximately 100,000 customer contacts annually based on the most recent data. They also input and processes solid waste charges, container/component information, and customer issue/concern requests.

This past year accounting personnel processed 6,237 residential container work orders (requests range from new service, additional container(s), upsize/downsize, repair, etc.), 540 commercial dumpster work orders (requests range from new service, additional dumpster(s), change in frequency, upsize/downsize, dumpster maintenance.)

**Exhibit 24. Summary of Accounting Activities for FY 2013/14**

| Activities | Total for FY 13/14 |
|---|---|
| Contacts with Public | 108,328 |
| Requisitions Processed | 887 |
| P-Cards Processed | 849 |
| Residential Charges Input | 26,706 |
| Commercial Charges Input | 1,206 |

- Assisted 225 residents with solid waste and recycling issues/concerns through e-mail correspondence.
- Assisted 250 businesses with solid waste issues and concerns through e-mail correspondence.
- Updated 830 residential and commercial component information.

# 6.0 ASSESSMENT OF POTENTIAL SYSTEM ALTERNATIVES

The following section discusses possible system alternatives to enhance customer service as well as potentially reducing costs. Based on our review and evaluation of the current solid waste system discussed in this Report, SCS considered potential candidate alternative scenarios for further analysis. These alternative scenarios address specific needs that currently exist within the current system.

## 6.1 COLLECTION

The current collection system fleet is older than the recommended industry standard, resulting in increased downtimes, higher maintenance costs, and the need to maintain additional vehicles for spare use. To improve this situation, SCS recommends a new equipment replacement plan that includes a lease purchase of approximately 10 new trucks in the first year and an annual allocation of funds that gradually increases annually to provide a sustainable level of replacement vehicles annually thereafter. This scenario is further described and modeled in Section 10 of this Plan.

Additional recommendations that address collection, including route optimization, and potential reduction or expansion of fleet size due to changes in the City's recycling program, are discussed in Section 9 of this Plan.

## 6.2 RECYCLING AND WASTE DIVERSION

SCS considered several alternatives to improve the City's recycling program by increasing diversion in cost-effective ways that will address key goals of this Plan.

### 6.2.1 Single Stream - Balcones Proposal

This scenario was evaluated for the Plan and included a detailed scenario model that is described in Section 7 and modeled in Section 10 in this Plan.

### 6.2.2 Single Stream - Fort Hood

This scenario was selected for detailed evaluation and is further described in Section 7 and modeled in Section 10 in this Plan.

### 6.2.3 Commercial Recycling

Modest commercial recycling is currently a part of the recycling program for the City. Diversion of scrap metals, old corrugated cardboard (OCC), and paper is being performed at the transfer station and the KRC. SCS recommends that these operations expand in the near future to capture additional materials that will yield higher revenues than other materials typically collected in single stream operations. A detailed pro-forma analysis will not be performed for this option at this time due to the other needs identified in the Plan for the next several years.

### 6.2.4 Yard Waste Diversion

Yard waste diversion could be enhanced by collecting all yard waste that is generated by residents. These materials would be delivered to the Bell County WCID composting facility for processing and development into compost products. Prior to considering this change to the current program, coordination with the Bell County WCID # 1 would be required to determine their ability to receive and process the materials that will be collected.

### 6.2.5 C & D Recycling

The City currently receives approximately 8,000 tons of C&D waste annually at the transfer station. Although some of these materials may be diverted from the waste stream for other uses, these types of recycling operations are very labor-intensive and typically require specialized equipment to implement. Unless there are specific end markets identified for these materials, it would not appear that C&D recycling would be cost effective given the existing quantities and composition of the waste.

## 6.3 TRANSFER AND DISPOSAL

The City of Killeen transfer station is performing a key service in the solid waste system at reasonable cost per ton of waste received. The facility processing costs per ton are within a range that is comparable to other transfer facilities of similar size and function. The facility performs a limited amount of waste diversion that provides some revenue to the City. Given that the current capacity exceeds the amount of waste being processed for disposal, there are opportunities to utilize a portion of the existing facility for enhanced materials recovery.

Possible alternatives include direct transfer of recyclables for offsite processing or utilizing a portion of the facility to process commercial recyclables in larger quantities to replace and upgrade current programs in place at other locations. At this stage, SCS is not proposing to model specific scenarios until the City has implemented the recycling options that are described and recommended in the Plan.

## 6.4 ADMINISTRATIVE

The Solid Waste Division provides accounting and customer support services to support the various solid waste collection and disposal services offered to the customers. Based on SCS' assessment of the current system compared to other cities with similar size of systems and services, the current level of staffing for administrative support appears to be sufficient to meet the City's current and near future needs. No specific changes are being considered in the proposed alternatives that are modeled in this Plan. However, due to the level of customer service and administrative duties outlined in Section 5.5, SCS recommends that an additional support person be added in the near future.

# 7.0 SELECTED SYSTEM ALTERNATIVES

## 7.1 ASSESSMENT OF ALTERNATIVES

### 7.1.1 Alternatives Selected for Detailed Analysis

The future solid waste management alternatives selected for detailed pro-forma financial analysis are identified below. These scenarios were selected based on meetings with City staff and ongoing discussions, as well as SCS' experience with other cities' solid waste management programs across the country. Each scenario is described in detail and a pro-forma financial model is provided for each scenario. The results of the analyses are presented along with supporting text and other information. This section of the Plan will provide important technical support for the final 20-year planning period recommendations:

**Scenario #1: Continue with the current solid waste system including the existing collection, recycling programs, and current transfer and disposal operations.**

Assumptions:

- Current solid waste collection, transfer, and disposal operations were modeled based on cost data provided by the City.
- Existing recycling programs are included and cost to operate the programs was modeled based on cost data provided by the City.
- Costs of anticipated new hauling and disposal contract are included for the projections.
- Costs of improvements to the waste collection fleet are taken into account.

**Scenario #2: Add a fleet replacement program to improve performance of the collection fleet and reduce maintenance costs.**

Assumptions:

- This scenario assumes that fleet replacement would be expedited with a lease purchase program to bring the age of the fleet within recommended guidelines. This program is described in Section 10 and Exhibits 31 and 32.
- From year five and beyond the annual fleet replacement budget includes the required amount to maintain the target age of the fleet.

**Scenario #3: Add single-stream curbside collection of recyclables and development of a material recovery facility to be jointly developed and operated by the City and Fort Hood with additional participation by other local governments.**

Assumptions:

- Collection of recyclables would be performed every other week.

- Recyclables would be processed at a newly developed MRF to be located adjacent to the City's current Transfer Station.

- The City would pay for the development of the new building and infrastructure and Fort Hood would provide some existing equipment and personnel to operate the MRF along with some recyclable materials. The City would provide the remaining additional equipment.

- Additional recyclable materials would be accepted from neighboring communities at an appropriate tipping fee.

- The MRF would be sized to accommodate modest growth through the planning period.

**Scenario #4: Add single-stream curbside recycling service to the existing solid waste system and contract with a private entity to process recyclables.**

Assumptions:

- The Scenario #3 model is modified to include a private MRF.

- Recyclables would be taken from the transfer station for transfer by a private entity to their MRF for processing.

- Revenue for materials and avoided transfer and disposal cost is included in the model.

- Potential penalties for material contamination and increased enforcement cost are considered.

**Scenario #5: End the current subscription curbside collection of recyclables.**

Assumptions:

- This scenario assumes that residential curbside collection of recyclables would no longer be performed by the City and that the materials collected and revenue from monthly fees would also be eliminated.

- Cost of equipment and personnel to operate the system would be eliminated and the savings reflected in the rates.

- A percentage of the recycling budget would also be saved as receiving and processing the materials would no longer be collected.

In addition to these scenarios, SCS considered the feasibility of adding C&D recycling to the existing transfer station operations. This consideration included the types and quantities of available materials that could potentially be diverted and potential costs of the program. Case studies are also presented in the appendix. At this time, SCS does not suggest developing a detailed pro-forma model for this program.

# 8.0 ADMINISTRATION AND ENFORCEMENT

The administration of solid waste within the City is described in Section 5 of this Plan. Current duties include billing and customer service. Compliance with solid waste ordinances is addressed by collection staff on an as-needed basis. The Division does not currently have a position that is dedicated to code compliance with respect to solid waste issues. Current Code Compliance Officers provide some limited support in this area.

## 8.1 CURRENT STATE REGULATORY ACTIVITIES

The State regulatory authority over solid waste is the TCEQ. The enforcement of solid waste issues is carried out by the region offices of the TCEQ. Killeen is part of Region 9 with offices in Waco. The Region has inspectors that respond to individual complaints from the public, as well as periodic inspections of solid waste facilities that are permitted or registered to receive solid waste. The Killeen transfer station receives periodic inspections from TCEQ for general compliance with the regulations and the facility registration. The most recent inspections indicated that the facility is in full compliance with the registration provisions and applicable TCEQ MSW rules. No violations have been recorded at the transfer station since the facility began operation in 2007. TCEQ has utilized the Killeen transfer station on several occasions to conduct tours as training for new state employees.

## 8.2 CURRENT CITY REGULATORY ACTIVITIES

The City currently has a number of ordinances governing solid waste inside the City. These are contained in Appendix F. A number of the recommendations will require amending the current ordinances to address the changes.

## 8.3 FUTURE RECOMMENDED ACTIVITIES

There is currently a need within the Solid Waste Division for a compliance officer or specialist. This position could enhance the Division's efforts to improve compliance and remedy issues involving improper use of carts and illegal dumping. In our experience with these issues a code compliance program generally returns more in savings and fees than the cost to fund such a position.

# 9.0 RECOMMENDATIONS AND IMPLEMENTATION SCHEDULE

## 9.1 PLAN RECOMMENDATIONS BASED ON ANALYSIS OF ALTERNATIVES AND ASSESSMENT OF NEEDS FOR THE SOLID WASTE PROGRAM

This Section presents the future solid waste management alternatives selected for implementation, as well as other recommendations for improvements to the solid waste system. These recommendations are a result of the planning efforts associated with the development of the 20-year master plan and rate study. Some of these recommendations are a result of detailed Pro-Forma Model analyses, and others were derived from analyses of existing systems along with recommended improvements to achieve goals set for the City. These recommendations were selected based on meetings with City staff, as well as SCS' experience with other cities and solid waste management programs across the country.

### 1. Recommendation #1: Develop and implement an equipment replacement plan to replace and maintain the solid waste fleet for improved performance and reduced maintenance costs.

Key Findings:

- Current equipment inventory has an average age that is beyond the recommended range for a collection fleet. This is resulting in higher maintenance costs and performance issues. Retain some of the most efficient vehicles to serve as spares. Typically, most "best in class" communities have a spare equipment ratio of 20 percent.

- Current replacement strategy is sporadic and inadequate to maintain recommended industry average age of fleet.

- The initial replacement plan includes a lease purchase component to replace most of the older equipment at one time and pay this out over a five-year timeframe.

- This plan also includes an annual allocation that gradually increases to a set amount that will provide for replacement of multiple large trucks annually to sustain the fleet.

- The City should perform a detailed routing study and audit of existing equipment within the next two to three years to verify the fleet is optimized for the needs of the near future. This study may provide additional fleet replacement savings.

- Conduct an internal analysis of maintenance services provided by Fleet Services to determine the effects of the new equipment replacement plan on maintenance costs and performance.

SCS recommends that in the near future some consideration should be given to a change in fuel to CNG or some hybrid type of fueling technology. As the infrastructure develops for CNG there may be long-term cost benefits in making this change at some point in the future.

### 2. Recommendation #2: End the curbside subscription recycling service and reallocate resources to improve the efficiency of the City's recycling programs.

Key Findings:

- Current subscription service for curbside collection of recyclable materials is not cost effective at several hundred dollars per ton of material collected.
- Other recycling services, including drop-off collection and commercial recycling, should be continued.
- Savings in collection and processing costs should be applied to other solid waste programs to better allocate resources.
- New recycling programs would replace the subscription service if City decides to continue residential curbside recycling service.

KRC Transition:

The KRC will undergo a period of transition in the future as the City implements the recommended single stream recycling programs and other recycling activities. The initial change to the current program will be the end to the current subscription curbside recycling service. SCS recommends that this service no longer be offered after the current FY. The KRC could continue to receive and process commercial and residential materials for distribution to markets until a new MRF is brought on line. This would be accomplished with a streamlined KRC operation including enough equipment and personnel to handle materials that are dropped-off by residents or businesses, and the limited amounts of materials collected from commercial sources and diverted from the transfer station. After the new MRF has been established the KRC could be converted to a drop-off facility or closed if that location is determined to be unnecessary with the new central recycling operation based at the MRF. If the KRC is converted to a citizen's collection center the City should consider allowing residents to dispose of waste materials including bulky items in addition to recyclable materials.

### 3. Recommendation #3: Add curbside collection of recyclables to the entire City and further evaluate the development of a materials recovery facility to be jointly developed and operated by the City and Fort Hood with additional participation by other local governments.

Key Findings:

- Implement every other week residential collection of collection of recyclables on a phased schedule depending on the processing option used.
- A single cart system should be used to simplify the system and minimize the additional costs of collection.
- Collected recyclables would be processed either at a jointly developed regional MRF in cooperation with Fort Hood, a local MRF, or at a private offsite facility that the City

contracts with to receive the materials. The selected method for processing will depend on the timing of this program and the viability of the regional MRF.

- Perform a feasibility level study of the MRF project with Fort Hood to further refine the planning level analysis of the project.

- The new MRF would be sized to accommodate modest growth through the planning period.

**4. Recommendation #4: Add curbside collection of yard wastes to the existing system to be delivered to Bell County WCID composting facility for processing.**

Key Findings:

- This recommendation would include the curbside collection of yard waste on a set-out basis for yard waste including grass and leaves generated by residences.

- Collection would be in craft bags designated for yard waste that may be purchased by residences, or bulk collection for a fee.

- Yard waste would be delivered to the existing Bell County WCID composting facility located at the closed landfill.

**5. Recommendation #5: Increase the commercial recycling efforts to capture a larger percentage of marketable recyclables that are generated within the City to provide additional revenue.**

Key Findings:

- The City currently diverts a small amount of cardboard, paper. and metals from residential and commercial sources that provide approximately $100,000 in revenue to the recycling operation.

- Additional revenue could be obtained by enhancing the collection and processing of selected commercial materials such as cardboard and paper.

- The existing transfer station has capacity to receive and process more of the commercial source-separated, recyclable materials with little or no modification to the current waste transfer operations.

- The City must identify potential sources and projected amounts of material to determine the level of equipment and personnel required to upgrade this program

- SCS recommends that the City evaluate the feasibility of C&D recycling within the next five to ten years. Based on the current composition of the waste stream, C&D is not a large enough component to consider implementation of a large-scale C&D recycling operation. This type of recycling operation requires significant investments in equipment and is fairly labor intensive. The City would be better served in the near future to focus

on specific materials that will bring in revenue such as metals. At this stage SCS does not foresee the need to develop a detailed pro-forma model for this potential program.

**6. Recommendation #6: Continue to monitor the Division's solid waste operating budgets and ensure that the rates are adjusted for changes to the CPI.**

Key Findings:

- The City should use the Pro-Forma Rate Model, developed as part of this Plan in the annual budget process to ensure that projected operating revenues cover projected operating expenses.
- The City should conduct an updated rate study in every three to four years.

## 9.2 PLAN RECOMMENDATIONS - IMPLEMENTATION SCHEDULE

**Exhibit 25. Plan Implementation Schedule**

| Recommendations | Fiscal Years | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2014-15 | | | | | 2019-20 | | | | | 2024-25 | | | | | 2029-30 | | | | | 2034-35 |
| Fleet Replacement Plan | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | | |
| Single Stream Recycling | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | |
| End Subscription Recycling | ■ | | | | | | | | | | | | | | | | | | | | |
| Additional Administrative Personnel | ■ | | | | | | | | | | | | | | | | | | | | |
| Yard Waste Diversion | | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | | |
| Commercial Recycling | | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | | |
| Transfer Station Floor Repair | | | | | ■ | | | | | | ■ | | | | | | ■ | | | | |
| C&D Recycling | | | | | | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | |
| CNG Hybrid Conversion | | | | | | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | |
| Evaluate Disposal Options | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Alternative Waste Management Methods | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

# 10.0 RATE STUDY AND PRO-FORMA ECONOMIC ANALYSIS

This Section describes the tasks involved in conducting the cost-of-service analysis. Before describing each of the tasks in detail, a brief overview of the City's current budget and management practices is provided. This section also provides the cost-of-service analysis.

## 10.1 BUDGET AND MANAGEMENT PRACTICES OVERVIEW

### 10.1.1 Budget Overview

The Division's financial system manages solid waste operations as an enterprise fund. The City has a consolidated utility billing system (water, sewer, and solid waste), whereby solid waste collection and recycling services are billed to residents monthly (Exhibit 26). There are also other miscellaneous service fees.

**Exhibit 26. Current Rate Structure**

| Item | Rate | | | | | | |
|---|---|---|---|---|---|---|---|
| Residential | | | | | | | |
| 96-gallon container | $17.50 per month | | | | | | |
| 64-gallon container | $15.60 per month | | | | | | |
| 32-gallon container | $14.38 per month | | | | | | |
| Free Disposal | <300 Pounds at Transfer Station; >$2.93 Per 100 Pounds | | | | | | |
| Premium Service | $22.00 For Truck to Come to Location | | | | | | |
| Curbside Recycling (Subscription Service) | $2.48 per month<br>$11.09 Additional Bins<br>$3.57 Lid Fee | | | | | | |
| Commercial | Collections Per Week (Dollars) | | | | | | |
| Dumpster Size (CY)*: | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2 | 73.02 | 111.37 | 155.76 | 200.15 | 245.48 | 288.92 | 333.31 |
| 3 | 89.12 | 138.24 | 194.70 | 251.18 | 307.65 | 364.124 | 420.59 |
| 4 | 104.24 | 164.19 | 232.74 | 301.27 | 369.85 | 38.41 | 506.96 |
| 6 | 136.47 | 217.92 | 310.64 | 403.35 | 496.07 | 588.78 | 681.49 |
| 8 | 168.69 | 271.51 | 388.51 | 505.40 | 622.27 | 739.17 | 856.05 |
| Roll Off Service: | | | | | | | |
| 20 (Open Top) | 399.00 | 695.40 | 991.80 | 1299.20 | 1584.50 | 1881.00 | 2177.40 |
| 30 (Open top) | 484.50 | 839.04 | 1194.72 | 1550.40 | 1906.08 | 2261.76 | 2575.26 |
| 40 (Open Top) | 558.60 | 974.70 | 1390.80 | 1803.48 | 1217.30 | 2631.12 | 3047.22 |
| Special Services | | | | | | | |
| Bulky waste | $20.00 per stop up to 3 cubic yards; > 3 cubic yards is $7.00 per cubic yards | | | | | | |
| Administrative Fees | | | | | | | |
| Switch Container Size | $10.00 | | | | | | |
| Container Repair | $19.00 + Cost of Replacement Parts | | | | | | |
| CFC Extraction | $40.00 | | | | | | |
| Dumpster Relocation | $50.50 | | | | | | |
| Transfer Station Account | $125.00 Initial Deposit | | | | | | |
| Locking Devices: | $31.38 Installation<br>$3.14 Monthly Rental | | | | | | |

*Extra pickups and additional pickups on site charged additional fees.

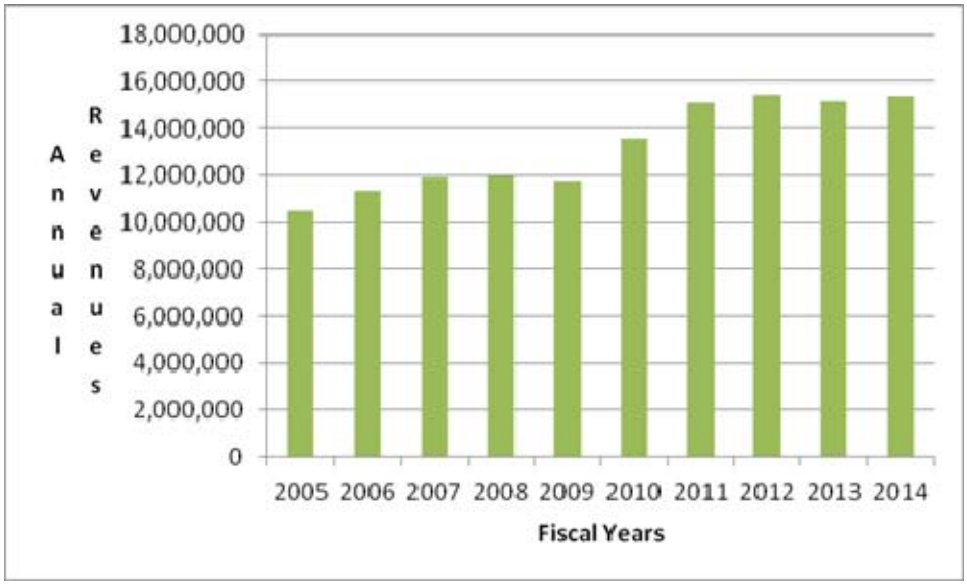
Source: City of Killeen.

Each year, the Division prepares an annual budget of revenues and expenses for the next fiscal year (October 1st) adopted by the City Council at least two months prior to the end of the fiscal year.

### 10.1.2 Operating Revenues

Exhibit 27 shows operating revenues for the Division for the past ten fiscal years. Over this time period, revenues have increased from $10.5 million in FY 2004/2005 to $15.4 million in FY 2013/2014; roughly a 47 percent increase. Revenues have been relatively stable, however, during the last three fiscal years, they have increased slightly.

**Exhibit 27. Solid Waste Fund Operating Revenues**

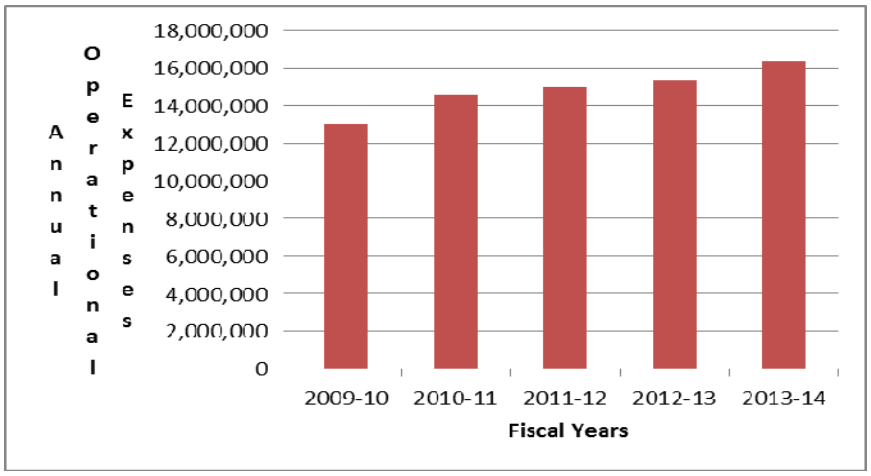



Source: City of Killeen

### 10.1.3 Operating Expenses

The Division's annual actual operating expenses for solid waste collection systems have increased over the past five years from about $13 million to about an estimated $16 million (Exhibit 28). Part of this increase is due to the increased customers, but a majority of this cost increase has been due to increased costs for labor, benefits, fuel, and vehicle maintenance.

**Exhibit 28. Division Operating Expenses, FY 2010-2014**




### 10.1.4 Fund Balance Capital

The City defines working capital as current assets minus current liabilities. Exhibit 29 shows the changes in working capital for the Division for fiscal years from 2005 through 2013. Over this nine-year period, the Solid Waste Fund has had an ending fund balance, which has averaged $3.6 million, declining somewhat in fiscal years 2010 and 2011, and increasing to a current balance of $4 million in the last fiscal year.

The City has enacted a fiscal policy statement (CCM/R 11-156R) in September 2011 to strive to maintain a target fund balance for all enterprise funds of 25 percent. If the fund balance falls below the goal, staff are directed to develop a plan for City Council to address the shortfall.

**Exhibit 29. Division Working Capital, By Fiscal Year**

| Ending Fiscal Year | Ending Fund Balance |
|---|---|
| 2005 | 4,043,515 |
| 2006 | 4,593,523 |
| 2007 | 4,930,049 |
| 2008 | 4,143,798 |
| 2009 | 3,006,334 |
| 2010 | 1,938,123 |
| 2011 | 2,560,274 |
| 2012 | 3,110,278 |
| 2013 | 3,473,822 |

Source: City of Killeen

### 10.1.5 Debt Service

The City has incurred debt to fund the construction of capital projects, primarily the transfer station, as well as solid waste supported debt as part of general obligations of the City:

- General Obligation Improvement and Refunding Bonds, Series 2014;
- General Obligation Improvement and Refunding Bonds, Series 2012; and

- Combination Tax and Revenue Certificates of Obligation, Series 2009.

Exhibit 30 shows the aggregate annual debt service payments by fiscal year (ending September 30th) through 2030 when the debt is retired. As of the year ending September 30, 2015, the Division is responsible for an aggregate total of $11,472,339 in principal and interest payments from customer revenues.

**Exhibit 30. Aggregate Annual Debt Service Payment, Solid Waste Division**

| Fiscal Year | Total Debt Payment | Fiscal Year | Total Debt Payment |
|---|---|---|---|
| 2015 | 729,257.50 | 2023 | 725,795.00 |
| 2016 | 723.357.50 | 2024 | 731,195.00 |
| 2017 | 721,657.50 | 2025 | 730,085.00 |
| 2018 | 721,295.50 | 2026 | 727,647.50 |
| 2019 | 723,370.50 | 2027 | 733,872.50 |
| 2020 | 727,035.00 | 2028 | 733,422.50 |
| 2021 | 721,035.00 | 2029 | 731,437.50 |
| 2022 | 724,085.00 | 2030 | 573,037.50 |

Source: City of Killeen.

### 10.1.6 Fleet and Capital Replacement Plan

Exhibits 31 and 32 contains the most current proposed Fleet Replacement Plan for the Division, which lists replacement of collection and ancillary equipment for the period of fiscal years 2015 through 2019. Exhibit 31 represents equipment replaced for diesel trucks. Exhibit 32 represents hybrid trucks. This option is discussed in Section 5.2.8. Typically, the Division has replaced only one or two vehicles of each type each year based on existing Division budgets. To provide a more timely replacement of these needed vehicles, the Division is proposing to enter into a Public Property Finance Contract[1] with Government Capital Corporation (GCC) at an annual interest rate of 2.99 percent over the five year period. This plan is reflected in the Fleet Replacement Plan Scenario, which is discussed in the rate scenario section 10.2.6.

**Exhibit 31. Proposed Division Fleet Replacement Plan (Diesel)**

| Vehicle Type | Estimated Cost Per Vehicle | Needed to Buy Each Year | | Vehicle Lease Program | |
|---|---|---|---|---|---|
| Boom Trucks | 139,218 | 1 | 139,218 | 1 | 139,218 |
| Rear Loader Trucks | 161,829 | 1 | 161,829 | 2 | 323,658 |
| Side Loader Trucks | 279,078 | 1 | 279,078 | 3 | 837,235 |
| Roll Off Trucks | 214,211 | 1 | 214,211 | 2 | 428,422 |
| Front Loader Trucks | 267,161 | 1 | 267,161 | 2 | 534,322 |
| ½ Ton Trucks | 22,507 | 1 | 22,507 | 3 | 67,520 |
| **Totals** | | **6** | **1,084,004** | **13** | **2,330,375** |
| | | | | | |
| | | | **GRAND TOTAL** | | **2,330,375** |

Source: City of Killeen.

[1] Contract means an agreement entered under the authority of Texas Local Government Code 271.001 and following (Public Property Finance Act).

**Exhibit 32. Proposed Division Fleet Replacement Plan (Hybrid)**

| Truck Type | Estimated Cost Per Vehicle | Needed to Buy Each Year | | Vehicle Lease Program | |
|---|---|---|---|---|---|
| Boom Truck | 139,218 | 1 | 139,218 | 1 | 139,218 |
| Rear Loader Truck | 161,829 | 1 | 161,829 | 1 | 161,829 |
| Side Loader Trucks | 354,078 | 1 | 354,078 | 3 | 1,062,234 |
| Roll-Off Trucks | 214,211 | 1 | 214,211 | 2 | 428,422 |
| Front Loader Trucks | 267,161 | 1 | 267,161 | 2 | 534,322 |
| **Totals** | | **5** | **1,136,497** | **9** | **2,326,025** |
| | | | | | |
| | | | | **GRAND TOTAL** | **2,326,025** |

Source: City of Killeen.

### 10.1.7 Solid Waste Tonnage

Exhibit 33 lists the solid waste tonnage delivered to the City's Transfer Station over the past 11 fiscal years. Over this time period, average annual tonnage received is 94,117 with an average annual percent change about 1.3 percent.

Exhibit 34 lists the Division's top 25 customers by MSW tonnage and revenues for the past 10 fiscal years.

**Exhibit 33. Solid Waste Tonnage Delivered to Transfer Station**

| Fiscal Year | Tons | Loads | Average Tons | Percentage Change in Tonnage |
|---|---|---|---|---|
| 2003 | 85,827 | 4,421 | 19.40 | |
| 2004 | 94,330 | 4,484 | 21.03 | 9.9 |
| 2005 | 95,479 | 4,646 | 20.55 | 1.2 |
| 2006 | 101,793 | 4,805 | 21.18 | 6.6 |
| 2007 | 97,718 | 4,446 | 21.97 | -4.0 |
| 2008 | 92,273 | 4,239 | 21.76 | -5.5 |
| 2009 | 96,762 | 4,348 | 22.25 | 4.8 |
| 2010 | 89,400 | 4,114 | 21.73 | -7.6 |
| 2011 | 92,598 | 4,219 | 21.94 | 3.5 |
| 2012 | 94,985 | 4,394 | 21.61 | 2.5 |
| 2013 | **95,000** | | | |
| **Averages** | **94,117** | **4,412** | **21.34** | **1.27** |

Source: City of Killeen.

**Exhibit 34. Division's Top 25 Largest Customers By Tonnage and Revenues (FY 2003-2012)**

| Rank | Customer | Tonnage | Customer | Revenue |
|---|---|---|---|---|
| 1 | Temporary Roll Off Containers | 53,729 | Temporary Roll Off Containers | $3,648,021 |
| 2 | Commercial Cash/Check | 38,007 | Commercial Cash/Check | $2,268,461 |
| 3 | Killeen Resident | 21,315 | Estradas Construction | $1,023,406 |
| 4 | Estradas Construction | 19,830 | Killeen Resident | $637,546 |
| 5 | Non Resident | 9,618 | Non Resident | $567,114 |
| 6 | Wal-Mart G.M. | 8,375 | Wal-Mart G.M. | $503,791 |
| 7 | HEB Receiving/Produce | 5,854 | HEB Receiving/Produce | $377,977 |
| 8 | Goodwill Industries | 5,107 | Goodwill Industries | $277,524 |
| 9 | Killeen Mall | 3,841 | Metroplex Hospital | $269,383 |
| 10 | Metroplex Hospital | 3,613 | Killeen Mall | $236,850 |
| 11 | Lowes Home Center | 3,566 | Lowes Home Center | $208,106 |
| 12 | B.A. Emmons | 3,377 | K.I.S.D. | $202,360 |
| 13 | Home Depot | 3,271 | Home Depot | $190,205 |
| 14 | K.I.S.D. | 2,539 | B.A. Emmons | $183,415 |
| 15 | Patriot Furniture/Vale Co | 2,510 | Patriot Furniture/Vale Co | $144,310 |
| 16 | Shenandoah Homes | 2,396 | 195 Lumber | $138,352 |
| 17 | Barnes Builders | 1,910 | Shenandoah Homes | $128,359 |
| 18 | Killeen Marble | 1,489 | House of Floors | $112,614 |
| 19 | 195 Lumber | 1,487 | H-Moving & Storage | $110,017 |
| 20 | H-Moving & Storage | 1,378 | Barnes Builders | $99,230 |
| 21 | Emerson Construction #1 | 1,339 | Killeen Marble | $95,647 |
| 22 | House of Floors | 1,312 | Ross/Omega Waste | $69,508 |
| 23 | All Star Homes | 1,170 | Emerson Construction #1 | $69,016 |
| 24 | Wallace Theatre | 1,067 | Time Warner Cablevision | $68,830 |
| 25 | Ross/Omega Waste | 1,037 | Golden Corral | $63,445 |

Source: City of Killeen.

## 10.2 PRO-FORMA MODEL

### 10.2.1 Data Collection

At the beginning of SCS' engagement, Division staff provided background data and information concerning residential collection revenues and operating expenses. This included the following critical information:

- Staffing and organizational charts;
- Wages and benefit rates;
- Customer records;

- Rate schedules;
- Loans;
- Fund account summaries (totals and comparisons);
- Past and current operating budgets by cost centers;
- Equipment replacement schedules;
- Waste deliveries;
- Fleet replacement plan;
- Division fleet labor, equipment, and fuel costs; and
- Ordinances.

### 10.2.2 Rate Model

At the outset of the work effort, SCS developed a Microsoft Excel™ spreadsheet-based, pro-forma model (Model) to assist in the completion of the rate analysis. This Model includes the following facets:

- An analysis of operational expenditures (personnel, contract and purchased services, materials and supplies, transfers);

- Analysis of capital outlays (equipment replacement and capital projects);

- Revenue sufficiency analysis (annual revenue projections and rate plan to provide sufficient revenues); and

- Funds analysis (reserve requirements, transfers to other funds, administrative costs, beginning and ending fund balances).

Based on data and information provided by the Division, these individual spreadsheets were linked to develop an overall Model to conduct the rate analysis.

### 10.2.3 Methodology Overview

The following methodology was utilized by SCS to conduct the cost of service analysis:

- **Collect Historical Actual Expenses and Revenues for the Division System -** The first task was to gather available historical actual revenue and cost data and include these into a financial database.

- **Develop of the "Test Year" -** The second task was the development of an annual revenue requirement for a "Test Year." The revenue requirement represents the total revenue for the system to recover during a year to fund all system costs. SCS worked with City staff to select a period that reflected a typical year for the system. Actual expenses for FY 2013/2014 were used as the basis of the test year. SCS then worked with City staff to make these costs more representative of anticipated conditions during the upcoming five-year financial planning horizon. The resulting Test Year was used as the basis for forecasting expenses for the five-year forecast (FY 14/15 to FY 19/20).

- **Development of a Revenue Requirement Projection** - After developing the revenue requirement for the test year, SCS worked with Division staff to project changes in anticipated costs due to inflation, labor increases, facility and vehicle maintenance, planning costs, etc. This resulted in a five-year revenue requirement forecast for the entire System including collection, recycling, and disposal of solid waste.

- **Revenue Offsets** - SCS worked with Division staff to develop estimates of the sales of recyclables from the single-stream recycling program and drop-off centers.

- **Allocation of Solid Waste System Costs** - SCS then worked with division staff to assign costs to the various cost centers, as noted in the paragraphs above.

- **Calculation of the Residential Monthly Fee** - SCS then distributed the costs across the anticipated number of residential units.

### 10.2.4 Development of the Revenue Projection

In addition to developing the test year revenue requirements, SCS forecasted the annual revenue requirement for FY 2013/2014 and FY 2014/2015 to FY 2019/2020. In order to develop the forecast, SCS projected how costs would change over the forecast period due to factors such as inflation and growth of the Division's customer base. The assumptions used to develop the forecast include the following annual increases:

- Inflation – 2.3 percent; and[2]
- Growth in Customer Accounts – 1.3 percent.[3]

### 10.2.5 Allocation of Costs to Division's Cost Centers

As noted in the paragraphs above, the Division has 11 different cost centers. These include the following:

- Accounting;
- Residential service;
- Commercial service;
- Recycling;
- Transfer station;
- Mowing;
- Debt service;
- Human resources;
- Information technology;
- General administration; and
- Non-Division

2 US Federal Reserve 10 year average inflation rate
3 Killeen Water and Wastewater Master Plan, 2012, Freese and Nichols, Inc.

Exhibit 35 identifies the cost of providing each service for FY 2014/2015 through FY 2019/2020. The data shown for FY 2013/2014 (past year) are the revenues that the City should have appropriated to the Division to meet projected needs.

**Exhibit 35. Revenue Requirement By Cost Center**

| Cost Centers | Fiscal Years | | | | | |
|---|---|---|---|---|---|---|
| | Projected | | | | | |
| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Accounting | $212,107 | $216,986 | $221,976 | $227,082 | $232,305 | $237,648 |
| Residential Services | $4,083,253 | $4,145,866 | $4,241,221 | $4,338,769 | $4,438,561 | $4,540,648 |
| Commercial Services | $1,913,432 | $1,987,719 | $2,033,436 | $2,080,205 | $2,128,050 | $2,176,995 |
| Recycling Program | $437,974 | $448,047 | $458,352 | $468,894 | $479,679 | $490,711 |
| Transfer Station | $5,139,982 | $5,257,163 | $5,378,078 | $5,501,774 | $5,628,314 | $5,757,766 |
| Mowing | $962,573 | $985,312 | $1,007,974 | $1,031,158 | $1,054,874 | $1,079,136 |
| Debt Service | $729,558 | $722,008 | $723,358 | $721,658 | $721,295 | $725,370 |
| Human Resources | $14,000 | $14,322 | $14,651 | $14,988 | $15,333 | $15,686 |
| Information Technology | $116,431 | $119,109 | $120,151 | $122,914 | $125,741 | $128,634 |
| General Administration | $22,500 | $23,018 | $23,547 | $24,088 | $24,643 | $25,209 |
| Non-Departmental | $2,713,979 | $2,776,401 | $2,840,258 | $2,905,584 | $2,972,412 | $3,040,778 |
| **Total Expenditures** | **$16,345,788** | **$16,695,949** | **$17,063,002** | **$17,437,114** | **$17,821,207** | **$18,218,580** |

### 10.2.6 Rate Scenarios

The following different rate scenarios were constructed using the Model:

- **Current Division Program** - This scenario assumes that the Division would continue to provide existing levels of services to its customers.

- **Fleet Replacement Plan** - This scenario assumes that the Division would provide the same levels of service to its customers, except that its fleet would be replaced early through an expedited lease purchase program in FY 2014/2015. This would require the Division to have one-time cash infusion replace antiquated vehicles. This scenario also assumes that the Division would increase its historic funding by an incremental $100,000 per year over the rate period, in order to maintain a funding of approximately $1 million a year.

- **Single Stream/Fort Hood MRF** - This scenario assumes that the Division would implement a Citywide curbside recycling program with collected recyclables delivered to a MRF developed in partnership with Fort Hood and other neighboring cities. This rate scenario assumes that the City would pay the debt service and Fort Hood would provide labor for operations. This cost-sharing structure was initially discussed during the Charrette the parties concerning the Fort Hood MRF project. It is also assumed that recycling revenues would be shared among the parties based on the quantities of recyclables delivered to the facility.

- **Single-Stream/Private MRF** - This scenario assumes that the Division would implement a Citywide curbside recycling program with recyclables collected by the Division and

delivered to a private MRF. This rate scenario assumes that the City would pay the processing fee all recyclables delivered and receive revenues from the vendor.

- **No Curbside Recycling Service** - This scenario assumes that the Division would discontinue its curbside recycling service and implement a single-stream recycling program.

## 10.3 KEY FINDINGS AND RATE RECOMMENDATIONS

This section of the report provides estimated revenue recovery using current rates, SCS' recommended customer fees, and the projected revenue generated over the five-year forecast period using the recommended fees and rates. A review of the Division's current staffing of residential and commercial services suggested a 80/20 split of Division-wide operational costs; 80 percent to the residential rate base, and 20 percent to the commercial rate base. In our experience, this split is fairly typical of most local solid waste agencies offering both residential and exclusive commercial collection services.

### 10.3.1 Residential Solid Waste Monthly Charges

Exhibit 36 shows the rate impact of each of these six scenarios for consideration by the City Council. Assuming the City adopts an initial rate increase immediately to $18.92, the then current program rate of $18.92 for 2014 indicates the need to increase current rates to meet the current expenses.

**Exhibit 36. Projected Residential Rates to Meet Revenue Needs**

| Residential Rate Impact ($/Account/Month) | | | | | | |
|---|---|---|---|---|---|---|
| Scenarios | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Current Program | $18.92 | $19.10 | $19.30 | $19.50 | $19.70 | $19.91 |
| Fleet Replacement Plan | $18.92 | $19.76 | $20.09 | $20.41 | $20.73 | $21.05 |
| Single Stream with Ft. Hood (Single Cart Program) | $18.92 | $19.76 | $21.37 | $21.65 | $21.93 | $22.21 |
| Single Stream with Ft. Hood (Multi Cart Program)* | $18.92 | $19.76 | $22.87 | $23.14 | $23.42 | $23.70 |
| Single Stream - Public/Private | $18.92 | $19.76 | $21.03 | $21.33 | $21.63 | $21.93 |
| Fleet Replacement Plan No Curbside Recycling | $18.92 | $19.01 | $19.32 | $19.63 | $19.95 | $20.26 |

* Based on the highest rate for the 96-gallon can of the multi cart program, the rates for the 64-gallon and 35-gallon cans would be $2 and $3 less, res

### 10.3.2 Commercial Solid Waste Charges

Exhibit 37 shows projected commercial solid waste user fee increases from the current rates to meet revenue requirement for each scenario.

**Exhibit 37. Projected Commercial Solid Waste Increases**

| Commercial Rate Impact (Annual %) | | | | | | |
|---|---|---|---|---|---|---|
| Scenarios | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Current Program | 4.88% | 5.52% | 6.20% | 6.89% | 7.59% | 8.31% |
| Fleet Replacement Plan | 4.88% | 7.80% | 8.91% | 10.02% | 11.12% | 12.24% |
| Single Stream | N/A | N/A | N/A | N/A | N/A | N/A |

### 10.3.3 Rate Recommendations

In order to meet the Division's anticipated revenue requirements, SCS makes the following recommendations:

- That the City move forward with implementing both a residential and commercial customer fee adjustment beginning in Fiscal Year 2014/2015. This rate increase will enable the Division to have sufficient revenues to meet anticipated fleet replacement needs, as well as helping meet increased operating costs. SCS recommends that the City also increase its special service and administrative fees by 5 percent and adjust these based on the CPI to address the Division's cost of providing these services.

- Based on the Division's overall objective of implementing the best value, single cart, single-stream recycling program Citywide, implementing a MRF project with Fort Hood (Scenario #3) appears the most feasible of all the MRF operating scenarios evaluated. Although the modeled rate, for scenario #3, is slightly higher than the private MRF scenario (scenario #3A), this option offers greater revenue potential and better control of the overall system for the City. More detailed cost estimating work will need to be accomplished should the City implement this option. Further, the roles and responsibilities of both parties will need to be more clearly delineated.

- Rates in the subsequent years should be annually increased for both residential and commercial customers by the CPI[4] for the Killeen region. Again, this will enable the Division to meet projected increases in operating costs. The solid waste fund balance should be maintained at 25 percent of annual expenses.

- The Division's actual expenses for services should be reviewed annually to assess whether an additional rate increase is warranted for extraordinary Division expenses. At a minimum, the Division should secure the services of an independent rate consultant every three years to reassess the Division's operational expenses and projected revenues.

4 Consumer Price Index for the Killeen Region – Bureau of Labor Statistics, U.S. Department of Labor

# 11.0 REFERENCES


1. Balcones Resources, *Proposal for Single-Stream Recycling Program*, October 25, 2013.

2. City of Killeen, Proposed Annual Budget and Plan for Municipal Services, FY 2014-2015.

3. City of Killeen, *An Easy Guide to Curbside Recycling*, October 2011.

4. City of Killeen, *City Code, Chapter 24, COK SW Ordinance*.

5. Pros Consulting, Solid Waste Cost of Service and Rate Design Study, August 2009.

6. Rogoff, Marc J., *Solid Waste Recycling and Processing: Planning of Solid Waste Recycling Facilities and Programs,* Second Edition, Waltham, MA, William Andrews/Elsevier, 2014.

7. Rogoff, Marc, *Analyzing Cost of Service and Designing Rates for Solid Waste Agenci*es, Kansas City, MO, American Public Works Association, 2007.

8. TCEQ Municipal Solid Waste Regulations.

9. State of Texas Annual Solid Waste Report, 2013.

10. Feasibility Study for Recycling at Fort Hood, 2011.

# Appendices

# APPENDIX A

# RATE MODEL PRO FORMA

# PRO FORMA MODEL
## CITY OF KILLEEN, TEXAS MODEL SUMMARY

**Division Revenue Needs**

| Cost Centers | Fiscal Years Projected | | | | | |
|---|---|---|---|---|---|---|
| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Accounting | $212,107 | $216,986 | $221,976 | $227,082 | $232,305 | $237,648 |
| Residential Services | $4,083,253 | $4,145,866 | $4,241,221 | $4,338,769 | $4,438,561 | $4,540,648 |
| Commercial Services | $1,913,432 | $1,987,719 | $2,033,436 | $2,080,205 | $2,128,050 | $2,176,995 |
| Recycling Program | $437,974 | $448,047 | $458,352 | $468,894 | $479,679 | $490,711 |
| Transfer Station | $5,139,982 | $5,257,163 | $5,378,078 | $5,501,774 | $5,628,314 | $5,757,766 |
| Mowing | $962,573 | $985,312 | $1,007,974 | $1,031,158 | $1,054,874 | $1,079,136 |
| Debt Service | $729,558 | $722,008 | $723,358 | $721,658 | $721,295 | $725,370 |
| Human Resources | $14,000 | $14,322 | $14,651 | $14,988 | $15,333 | $15,686 |
| Information Technology | $116,431 | $119,109 | $120,151 | $122,914 | $125,741 | $128,634 |
| General Administration | $22,500 | $23,018 | $23,547 | $24,088 | $24,643 | $25,209 |
| Non-Departmental | $2,713,979 | $2,776,401 | $2,840,258 | $2,905,584 | $2,972,412 | $3,040,778 |
| **Total Expenditures** | **$16,345,788** | **$16,695,949** | **$17,063,002** | **$17,437,114** | **$17,821,207** | **$18,218,580** |
| | | | | | | |
| Non-Rate Revenues | $663,220 | $671,842 | $680,576 | $689,423 | $698,386 | $707,465 |
| | | | | | | |
| **Projected Revenue Requirements** | **$15,682,568** | **$16,024,107** | **$16,382,426** | **$16,747,691** | **$17,122,821** | **$17,511,115** |
| | | | | | | |
| Projected Operating Surplus(Deficits) | ($1,042,261) | ($1,193,476) | ($1,358,997) | ($1,528,957) | ($1,706,244) | ($1,894,123) |

| Personnel By Area | |
|---|---|
| Accounting | 4 |
| Residential | 43 |
| Commercial | 14 |
| Container | 7 |
| Management | 2 |
| Transfer Station | 16 |
| Recycling | 7 |

| | Current Monthly Charge |
|---|---|
| Residential | $17.50 |

Commercial Calcs

Current

Fleet

**Projected Revenue Needed - Various Scenarios**

| | Scenarios | Fiscal Years Projected | | | | | |
|---|---|---|---|---|---|---|---|
| | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 1 | Current Program | $16,345,788 | $16,695,949 | $17,063,002 | $17,437,114 | $17,821,207 | $18,218,580 |
| 2 | Fleet Replacement Plan | $16,345,788 | $17,190,652 | $17,657,705 | $18,131,817 | $18,615,910 | $19,113,283 |
| 3 | Single Stream with Ft. Hood (Single Cart Program) | $16,345,788 | $17,190,652 | $18,629,956 | $19,084,549 | $19,548,441 | $20,024,906 |
| 3A | Single Stream with Ft. Hood (Multi Cart Program) | $16,345,788 | $17,190,652 | $18,930,077 | $19,385,214 | $19,849,662 | $20,326,696 |
| 4 | Single Stream - Public/Private | $16,345,788 | $17,190,652 | $18,367,067 | $18,835,317 | $19,313,326 | $19,804,385 |
| 5 | Fleet Replacement Plan No Curbside Recycling | $16,345,788 | $16,628,253 | $17,081,519 | $17,541,515 | $18,011,157 | $18,493,735 |
| | **Projected Revenues** | | | | | | |
| | Rate Base | $15,303,527 | $15,502,473 | $15,704,005 | $15,908,157 | $16,114,963 | $16,324,458 |
| | Non-Rate Base | $663,220 | $671,842 | $680,576 | $689,423 | $698,386 | $707,465 |

| | Projected Number of Customers | | | | | | |
|---|---|---|---|---|---|---|---|
| | Residential Cans | 46,000 | 46,598 | 47,204 | 47,817 | 48,439 | 49,069 |
| | Master Accounts | 43,062 | 43,622 | 44,189 | 44,763 | 45,345 | 45,935 |

| | Residential Rate Impact ($/Account/Month) | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | Current Program | $18.92 | $19.10 | $19.30 | $19.50 | $19.70 | $19.91 |
| 2 | Fleet Replacement Plan | $18.92 | $19.76 | $20.09 | $20.41 | $20.73 | $21.05 |
| 3 | Single Stream with Ft. Hood (Single Cart Program) | $18.92 | $19.76 | $21.37 | $21.65 | $21.93 | $22.21 |
| 3A | Single Stream with Ft. Hood (Multi Cart Program)* | $18.92 | $19.76 | $22.87 | $23.14 | $23.42 | $23.70 |
| 4 | Single Stream - Public/Private | $18.92 | $19.76 | $21.03 | $21.33 | $21.63 | $21.93 |
| 5 | Fleet Replacement Plan No Curbside Recycling | $18.92 | $19.01 | $19.32 | $19.63 | $19.95 | $20.26 |

* Based on the highest rate for the 96-gallon can of the multi cart program, the rates for the 64-gallon and 35-gallon cans would be $2 and $3 less, respectively.

**Commercial Rate Impact (Annual %)**

| Scenarios | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
|---|---|---|---|---|---|---|
| Current Program | 4.88% | 5.52% | 6.20% | 6.89% | 7.59% | 8.31% |
| Fleet Replacement Plan | 4.88% | 7.80% | 8.91% | 10.02% | 11.12% | 12.24% |
| Single Stream | N/A | N/A | N/A | N/A | N/A | N/A |
| | | | | | | |
| Actual Revenues | 5,339,837 | 5,409,255 | 5,479,575 | 5,550,809 | 5,622,970 | 5,696,069 |
| Needed Revenues | 5,600,402 | 5,707,624 | 5,819,324 | 5,933,049 | 6,049,531 | 6,169,599 |
| % Increase in Rates Needed | 4.880% | 5.516% | 6.200% | 6.886% | 7.586% | 8.313% |
| | | | | | | |
| Actual Revenues | 5,339,837 | 5,409,255 | 5,479,575 | 5,550,809 | 5,622,970 | 5,696,069 |
| Needed Revenues | 5,600,402 | 5,831,299 | 5,968,000 | 6,106,724 | 6,248,207 | 6,393,275 |
| % Increase in Rates Needed | 4.880% | 7.802% | 8.914% | 10.015% | 11.119% | 12.240% |

# PRO FORMA MODEL
## CITY OF KILLEEN, TEXAS SCENARIO BREAKDOWN

| Scenario 1 - Current Program | Fiscal Years | | | | | |
|---|---|---|---|---|---|---|
| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Projected Revenue Needed | | | | | | |
| Current Program | $16,345,788 | $16,695,949 | $17,063,002 | $17,437,114 | $17,821,207 | $18,218,580 |
| ***Total Rev Needed*** | ***$16,345,788*** | ***$16,695,949*** | ***$17,063,002*** | ***$17,437,114*** | ***$17,821,207*** | ***$18,218,580*** |
| | | | | | | |
| Projected Revenue | $15,303,527 | $15,502,473 | $15,704,005 | $15,908,157 | $16,114,963 | $16,324,458 |
| | | | | | | |
| Additional Revenue Needed | $1,042,261 | $1,193,476 | $1,358,997 | $1,528,957 | $1,706,244 | $1,894,123 |
| | | | | | | |
| Projected Residential Cans | 46,000 | 46,598 | 47,204 | 47,817 | 48,439 | 49,069 |
| | | | | | | |
| **Add. cost per Res. Can/month (75% of Add. Rev)** | **$1.42** | **$1.60** | **$1.80** | **$2.00** | **$2.20** | **$2.41** |
| **Total Cost per Res. can per month (w/$17.50)** | **$18.92** | **$19.10** | **$19.30** | **$19.50** | **$19.70** | **$19.91** |

| Scenario 2 - Fleet Replacement Program | Fiscal Years | | | | | |
|---|---|---|---|---|---|---|
| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Projected Revenue Needed | | | | | | |
| Current Program | $16,345,788 | $16,695,949 | $17,063,002 | $17,437,114 | $17,821,207 | $18,218,580 |
| Fleet Purchase | $0 | $494,702 | $494,702 | $494,702 | $494,702 | $494,702 |
| Add. Fleet Purchase | $0 | $100,000 | $200,000 | $300,000 | $400,000 | $500,000 |
| Annual Maintenance Savings | $0 | ($100,000) | ($100,000) | ($100,000) | ($100,000) | ($100,000) |
| ***Total Rev Needed*** | ***$16,345,788*** | ***$17,190,652*** | ***$17,657,705*** | ***$18,131,817*** | ***$18,615,910*** | ***$19,113,283*** |
| | | | | | | |
| Projected Revenue | $15,303,527 | $15,502,473 | $15,704,005 | $15,908,157 | $16,114,963 | $16,324,458 |
| | | | | | | |
| Additional Revenue Needed | $1,042,261 | $1,688,179 | $1,953,700 | $2,223,660 | $2,500,947 | $2,788,825 |
| | | | | | | |
| Projected Residential Cans | 46,000 | 46,598 | 47,204 | 47,817 | 48,439 | 49,069 |
| | | | | | | |
| **Add. cost per Res. Can/month (75% of Add. Rev)** | **$1.42** | **$2.26** | **$2.59** | **$2.91** | **$3.23** | **$3.55** |
| **Total Cost per Res. can per month (w/$17.50)** | **$18.92** | **$19.76** | **$20.09** | **$20.41** | **$20.73** | **$21.05** |

| Scenario 3 - Single Stream with Ft. Hood | Fiscal Years | | | | | |
|---|---|---|---|---|---|---|
| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Projected Revenue Needed (Single Cart Program) | | | | | | |
| Fleet Purchase Program | $16,345,788 | $17,190,652 | $17,657,705 | $18,131,817 | $18,615,910 | $19,113,283 |
| Annual Debt Service | $0 | $0 | $562,889 | $562,889 | $562,889 | $562,889 |
| New Curbside Revenue Needed | $0 | $0 | $895,548 | $890,145 | $884,395 | $878,283 |
| O&M (Non-Labor, $15/ton for 6k tons) | $0 | $0 | $90,000 | $90,000 | $90,000 | $90,000 |
| Voluntary Curbside Collection (Deduct) | $0 | $0 | ($384,285) | ($393,124) | ($402,166) | ($411,416) |
| Recycling Cost Center (Deduct) | $0 | $0 | ($278,214) | ($284,613) | ($291,159) | ($297,855) |
| Loss of Curbside Collection Fee Revenue | $0 | $0 | $86,313 | $87,435 | $88,572 | $89,724 |
| ***Total Rev Needed*** | ***$16,345,788*** | ***$17,190,652*** | ***$18,629,956*** | ***$19,084,549*** | ***$19,548,441*** | ***$20,024,906*** |
| | | | | | | |
| Projected Revenue | $15,303,527 | $15,502,473 | $15,704,005 | $15,908,157 | $16,114,963 | $16,324,458 |
| | | | | | | |
| Additional Revenue Needed | $1,042,261 | $1,688,179 | $2,925,951 | $3,176,392 | $3,433,478 | $3,700,449 |
| | | | | | | |
| Projected Residential Cans | 46,000 | 46,598 | 47,204 | 47,817 | 48,439 | 49,069 |
| | | | | | | |
| **Add. cost per Res. Can/month (75% of Add. Rev)** | **$1.42** | **$2.26** | **$3.87** | **$4.15** | **$4.43** | **$4.71** |
| **Total Cost per Res. can per month (w/$17.50)** | **$18.92** | **$19.76** | **$21.37** | **$21.65** | **$21.93** | **$22.21** |

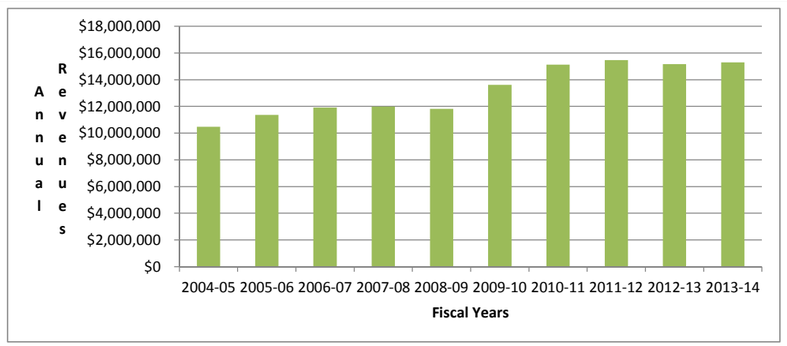
| Scenario 3A - Single Stream with Ft. Hood (Multi Cart Program) | Fiscal Years | | | | | |
|---|---|---|---|---|---|---|
| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Projected Revenue Needed | | | | | | |
| Fleet Purchase Program | $16,345,788 | $17,190,652 | $17,657,705 | $18,131,817 | $18,615,910 | $19,113,283 |
| Annual Debt Service | $0 | $0 | $562,889 | $562,889 | $562,889 | $562,889 |
| New Curbside Revenue Needed | $0 | $0 | $1,195,670 | $1,190,810 | $1,185,616 | $1,180,072 |
| O&M (Non-Labor, $15/ton for 6k tons) | $0 | $0 | $90,000 | $90,000 | $90,000 | $90,000 |
| Voluntary Curbside Collection (Deduct) | $0 | $0 | ($384,285) | ($393,124) | ($402,166) | ($411,416) |
| Recycling Cost Center (Deduct) | $0 | $0 | ($278,214) | ($284,613) | ($291,159) | ($297,855) |
| Loss of Curbside Collection Fee Revenue | $0 | $0 | $86,313 | $87,435 | $88,572 | $89,724 |
| ***Total Rev Needed*** | ***$16,345,788*** | ***$17,190,652*** | ***$18,930,077*** | ***$19,385,214*** | ***$19,849,662*** | ***$20,326,696*** |
| | | | | | | |
| Projected Revenue | $15,303,527 | $15,502,473 | $15,704,005 | $15,908,157 | $16,114,963 | $16,324,458 |
| | | | | | | |
| Additional Revenue Needed | $1,042,261 | $1,688,179 | $3,226,072 | $3,477,057 | $3,734,699 | $4,002,239 |
| | | | | | | |
| Projected Residential Cans | 46,000 | 46,598 | 47,204 | 47,817 | 48,439 | 49,069 |
| | | | | | | |
| **Add. cost per Res. Can/month (75% of Add. Rev** | **$1.42** | **$2.26** | **$4.27** | **$4.54** | **$4.82** | **$5.10** |
| **Total Cost per Res. can per month (w/$17.50)** | **$18.92** | **$19.76** | **$21.77** | **$22.04** | **$22.32** | **$22.60** |
| | | | | | | |
| Add. cost per Res. 96 gallon Can/month (50% of total amount of cans) | - | - | $5.37 | $5.64 | $5.92 | $6.20 |
| Add. cost per Res. 64 gallon Can/month (40% of total amount of cans) | - | - | $3.37 | $3.64 | $3.92 | $4.20 |
| Add. cost per Res. 35 gallon Can/month (10% of total amount of cans) | - | - | $2.37 | $2.64 | $2.92 | $3.20 |

| Scenario 4 - Single Stream with Public/Private | Fiscal Years | | | | | |
|---|---|---|---|---|---|---|
| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Projected Revenue Needed | | | | | | |
| Fleet Purchase Program | $16,345,788 | $17,190,652 | $17,657,705 | $18,131,817 | $18,615,910 | $19,113,283 |
| New Curbside Revenue Needed | $0 | $0 | $1,285,548 | $1,293,802 | $1,302,169 | $1,310,650 |
| Voluntary Curbside Collection (Deduct) | $0 | $0 | ($384,285) | ($393,124) | ($402,166) | ($411,416) |
| Recycling Cost Center (Deduct) | $0 | $0 | ($278,214) | ($284,613) | ($291,159) | ($297,855) |
| Loss of Curbside Collection Fee Revenue | $0 | $0 | $86,313 | $87,435 | $88,572 | $89,724 |
| ***Total Rev Needed*** | ***$16,345,788*** | ***$17,190,652*** | ***$18,367,067*** | ***$18,835,317*** | ***$19,313,326*** | ***$19,804,385*** |
| | | | | | | |
| Projected Revenue | $15,303,527 | $15,502,473 | $15,704,005 | $15,908,157 | $16,114,963 | $16,324,458 |
| | | | | | | |
| Additional Revenue Needed | $1,042,261 | $1,688,179 | $2,663,062 | $2,927,160 | $3,198,363 | $3,479,928 |
| | | | | | | |
| Projected Residential Cans | 46,000 | 46,598 | 47,204 | 47,817 | 48,439 | 49,069 |
| | | | | | | |
| **Add. cost per Res. Can/month (75% of Add. Rev** | **$1.42** | **$2.26** | **$3.53** | **$3.83** | **$4.13** | **$4.43** |
| **Total Cost per Res. can per month (w/$17.50)** | **$18.92** | **$19.76** | **$21.03** | **$21.33** | **$21.63** | **$21.93** |

| Scenario 5 - Fleet Replacement w/o Curbside Recycling | Fiscal Years | | | | | |
|---|---|---|---|---|---|---|
| | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Projected Revenue Needed | | | | | | |
| Fleet Purchase Program | $16,345,788 | $17,190,652 | $17,657,705 | $18,131,817 | $18,615,910 | $19,113,283 |
| Voluntary Curbside Collection (Deduct) | $0 | ($375,646) | ($384,285) | ($393,124) | ($402,166) | ($411,416) |
| Recycling Cost Center (Deduct) | $0 | ($271,959) | ($278,214) | ($284,613) | ($291,159) | ($297,855) |
| Loss of Curbside Collection Fee Revenue | $0 | $85,206 | $86,313 | $87,435 | $88,572 | $89,724 |
| ***Total Rev Needed*** | ***$16,345,788*** | ***$16,628,253*** | ***$17,081,519*** | ***$17,541,515*** | ***$18,011,157*** | ***$18,493,735*** |
| | | | | | | |
| Projected Revenue | $15,303,527 | $15,502,473 | $15,704,005 | $15,908,157 | $16,114,963 | $16,324,458 |
| | | | | | | |
| Additional Revenue Needed | $1,042,261 | $1,125,780 | $1,377,514 | $1,633,358 | $1,896,194 | $2,169,278 |
| | | | | | | |
| Projected Residential Cans | 46,000 | 46,598 | 47,204 | 47,817 | 48,439 | 49,069 |
| | | | | | | |
| **Add. cost per Res. Can/month (75% of Add. Rev** | **$1.42** | **$1.51** | **$1.82** | **$2.13** | **$2.45** | **$2.76** |
| **Total Cost per Res. can per month (w/$17.50)** | **$18.92** | **$19.01** | **$19.32** | **$19.63** | **$19.95** | **$20.26** |

# PRO FORMA MODEL
# CITY OF KILLEEN, TEXAS
# REVENUES

| REVENUES | Fiscal Year | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | | | | Projected | | | | | 2012-13 |
| | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 | Non-Rate Revenues |
| Transfer Station Fees | $246,916 | $315,566 | $303,756 | $338,195 | $306,519 | $382,941 | $384,968 | $347,304 | $274,251 | $448,742 | | $454,576 | $460,485 | $466,471 | $472,536 | $478,678 | $448,742 |
| Dumpster Rentals | $315,181 | $364,138 | $202,879 | $93,427 | $84,530 | $88,182 | $107,923 | $99,205 | $96,306 | $92,761 | | $93,967 | $95,189 | $96,426 | $97,680 | $98,950 | $0 |
| Sale of Equipment | $8,235 | $67,615 | $20,254 | $31,794 | $0 | $814 | $21,334 | $31,364 | $10,412 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| Tire Disposal Fees | $4,245 | $4,753 | $4,206 | $5,245 | $0 | $6,123 | $6,393 | $6,695 | $7,641 | $6,729 | | $6,816 | $6,905 | $6,995 | $7,086 | $7,178 | $6,729 |
| Sale of Metals-Recycling | $50,248 | $54,389 | $66,252 | $67,157 | $0 | $52,100 | $60,965 | $52,732 | $50,714 | $63,328 | | $64,152 | $64,986 | $65,830 | $66,686 | $67,553 | $63,328 |
| Paper Products Recycling | $45,074 | $40,167 | $57,169 | $74,600 | $0 | $67,100 | $80,050 | $87,725 | $50,329 | $55,716 | | $56,440 | $57,174 | $57,917 | $58,670 | $59,433 | $55,716 |
| Public Scale Fees | $15,038 | $9,906 | $8,972 | $8,734 | $0 | $11,504 | $8,577 | $9,426 | $7,370 | $6,736 | | $6,824 | $6,912 | $7,002 | $7,093 | $7,185 | $6,736 |
| Other Recycle Revenues | $2,363 | $5,087 | $4,678 | $5,454 | $82,008 | $4,609 | $5,875 | $5,778 | $10,302 | $15,602 | | $15,805 | $16,011 | $16,219 | $16,430 | $16,643 | $15,602 |
| Customer Reycling Fees | $38,256 | $37,902 | $39,588 | $44,769 | $56,720 | $75,024 | $82,516 | $85,112 | $85,487 | $84,112 | | $85,206 | $86,313 | $87,435 | $88,572 | $89,724 | $0 |
| Commercial Sanitation Fees | $4,232,371 | $4,588,263 | $4,995,338 | $4,860,543 | $4,787,442 | $5,390,214 | $5,327,768 | $5,286,025 | $5,426,073 | $5,339,837 | | $5,409,255 | $5,479,575 | $5,550,809 | $5,622,970 | $5,696,069 | $0 |
| Residential Sanitation Fees | $5,391,038 | $5,641,428 | $5,932,790 | $6,261,284 | $6,385,299 | $7,504,292 | $8,474,410 | $8,846,363 | $8,421,940 | $9,123,597 | | $9,242,203 | $9,362,352 | $9,484,062 | $9,607,355 | $9,732,251 | $0 |
| Interest Earned | $130,979 | $229,186 | $284,923 | $192,204 | $47,584 | $13,519 | $8,309 | $8,605 | $7,833 | $2,081 | | $2,108 | $2,135 | $2,163 | $2,191 | $2,220 | $2,081 |
| Compost Facility Lease | $0 | $0 | $0 | $0 | $0 | $18,000 | $18,000 | $0 | $18,000 | $18,000 | | $18,234 | $18,471 | $18,711 | $18,954 | $19,201 | $18,000 |
| Knife River Lease | $0 | $0 | $0 | $0 | $0 | $0 | $31,613 | $27,500 | $30,096 | $30,000 | | $30,390 | $30,785 | $31,185 | $31,591 | $32,001 | $30,000 |
| Miscellaneous Receipts | $105 | $49 | $6 | $551 | $59,104 | $4,486 | $504,632 | $589,073 | $96,841 | $16,286 | | $16,497 | $16,712 | $16,929 | $17,149 | $17,372 | $16,286 |
| **TOTAL CURRENT REVENUES** | **$10,480,049** | **$11,358,449** | **$11,920,812** | **$11,979,630** | **$11,809,206** | **$13,618,916** | **$15,125,156** | **$15,461,802** | **$15,160,627** | **$15,303,527** | | **$15,502,473** | **$15,704,005** | **$15,908,157** | **$16,114,963** | **$16,324,458** | **$663,220** |
| **Percent Difference** | | **8.38%** | **4.95%** | **0.49%** | **-1.42%** | **15.32%** | **11.06%** | **2.23%** | **-1.95%** | **0.94%** | | **1.30%** | **1.30%** | **1.30%** | **1.30%** | **1.30%** | |



# PRO FORMA MODEL
# CITY OF KILLEEN, TEXAS
# ASSUMPTIONS

| Item | Input Description | Quantity | Units/Description | Comments/Source |
|---|---|---|---|---|
| **REVENUE** | | | | |
| 1 | Recyclables | | Included in MRF Revenues | SCS Calculated |
| 2 | | | | |
| 3 | Customer Charges | | | City Provided |
| 4 | Government Grants | $0 | None Anticipated | City Provided |
| 5 | Growth in Customer Accounts | | | SCS Calculated |
| 6 | Average Growth | 1.3% | | City Provided; Annual growth rate over 2 decades |
| **EXPENSES** | | | | |
| 7 | Inflation Rate | 2.3% | | SCS Assumptions - 11 Year US Average |
| 8 | Tipping Fee Escalation Rate | 2.3% | | SCS Assumptions |
| 9 | Pro Rate Escalation of August 2014 to End of Fiscal Year | 8.70% | | |
| 10 | Annual Increase in Traditional Fleet Purchases | $100,000 | | SCS Assumptions |
| 11 | Annual Savings in Mainteance Due to Newer Trucks | $100,000 | From $500,000 (current expenses) | SCS Assumptions |
| **RESERVES** | | | | |
| 12 | General Department Reserve | $0 | No change in Fund Balance from 2014 | City Provided |
| **CUSTOMERS** | | | | |
| 13 | Residential | 46,000 | | City Provided |
| 14 | Commercial | 1,723 | | City Provided |
| **MATERIALS RECOVERY FACILITY SCENARIO** | | | | |
| 15 | Building | $3,500,000 | 30,000 Square Foot Building | SCS Assumptions |
| 16 | Improvements | $1,300,000 | | SCS Assumptions |
| 17 | Equipment | $3,000,000 | 50 Ton Per Day Processing Capacity | SCS Assumptions |
| 18 | Annual Debt Service | $562,889 | 3.5%, 20 Year | SCS Assumptions |
| 19 | Operation and Maintenance (Non Labor) | $15 | Per Design Ton; 30% non-labor | SCS Assumptions |
| 20 | Labor | $0 | Provided Free by Ft. Hood | SCS Assumptions |
| 21 | Incoming Recyclables | 6,000 | Killeen | SCS Assumptions |
| | | 4,000 | Ft Hood | SCS Assumptions |
| | | 2,000 | Harker Hts, Copperas, Gatesville | SCS Assumptions |
| 22 | MRF Recycling Revenues | $70 | Ton | SCS Assumptions |
| 23 | Public/Private MRF Recycling Revenues | $5 | Ton | SCS Assumptions |
| 24 | Revenue Split (Based on Tonnage) | 50% | Killeen Share | SCS Assumptions |
| 25 | Voluntary Curbside Collection (Deduct) | $375,646 | City Crews 2016 | SCS Assumptions |
| 26 | Recycling Cost Center Budget (Deduct) | $271,959 | 58%, 2016 Costs | SCS Assumptions |
| 27 | Voluntary Curbside Collection Revenue (Deduct) | $84,112 | User Fees@$2.48/Month | City Provided |
| 28 | New Curbside Collection Program - City MRF | $895,548 | Deducts for Landfill Avoidance and Recycling | SCS Model |
| 29 | New Curbside Collection Program - Private MRF | $1,285,548 | Deducts for Landfill Avoidance and Recycling | SCS Model |

| INFLATED CURBSIDE COSTS | | | | | |
|---|---|---|---|---|---|
| Item | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| Collection | $375,646 | $384,285 | $393,124 | $402,166 | $411,416 |
| Recy Cost Center | $271,959 | $278,214 | $284,613 | $291,159 | $297,855 |
| New Collection | $895,548 | $890,145 | $884,395 | $878,283 | $871,792 |
| New Collection | $1,285,548 | $1,293,802 | $1,302,169 | $1,310,650 | $1,319,245 |

# PRO FORMA MODEL
# CITY OF KILLEEEN, TEXAS
# PROPOSED FLEET LEASE PROGRAM

| Payment | Year | | | | |
|---|---|---|---|---|---|
| | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| | $494,702 | $494,702 | $494,702 | $494,702 | $494,702 |

| | |
|---|---|
| Loan of | $2,334,000 |
| Rate | 2.99% |
| # of Payments | 5 |
| Payment Cost | ($494,702) |

# PRO FORMA MODEL
# CITY OF KILLEEEN, TEXAS
# PROPOSED CURBSIDE COLLECTION PROGRAM

| Operating Year | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 |
| **QUANTITIES** | | | | | | | | | | | |
| (1) | Recylables (Ton) | 6,000 | 6,060 | 6,121 | 6,182 | 6,244 | 6,306 | 6,369 | 6,433 | 6,497 | 6,562 |
| **REVENUES** | | | | | | | | | | | |
| (2) | Recyclables - City MRF ($70/ton, 2.3%) | $420,000 | $433,957 | $448,377 | $463,277 | $478,671 | $494,577 | $511,012 | $527,993 | $545,538 | $563,667 |
| | Recyclables - Private MRF ($5/ton) | $30,000 | $30,300 | $30,603 | $30,909 | $31,218 | $31,530 | $31,846 | $32,164 | $32,486 | $32,811 |
| (3) | Landfill Avoidance | $235,200 | $243,016 | $251,091 | $259,435 | $268,056 | $276,963 | $286,167 | $295,676 | $305,502 | $315,653 |
| | **Total Revenues - City MRF** | **$655,200** | **$676,972** | **$699,468** | **$722,711** | **$746,727** | **$771,541** | **$797,179** | **$823,669** | **$851,040** | **$879,320** |
| | **Total Revenues - Private MRF** | **$265,200** | **$273,316** | **$281,694** | **$290,344** | **$299,274** | **$308,494** | **$318,012** | **$327,840** | **$337,987** | **$348,464** |
| **EXPENSES** | | | | | | | | | | | |
| (4) | Equipment O&M | $252,000 | $257,796 | $263,725 | $269,791 | $275,996 | $282,344 | $288,838 | $295,481 | $302,277 | $309,230 |
| (5) | Labor | $220,646 | $225,721 | $230,913 | $236,224 | $241,657 | $247,215 | $252,901 | $258,718 | $264,668 | $270,756 |
| (6) | Truck Amoritization | $333,667 | $333,667 | $333,667 | $333,667 | $333,667 | $333,667 | $333,667 | $333,667 | $333,667 | $333,667 |
| (7) | Cart Amoritization - Single Cart Program | $265,650 | $265,650 | $265,650 | $265,650 | $265,650 | $265,650 | $265,650 | $265,650 | $265,650 | $265,650 |
| | Cart Amoritization - Multi Cart Program | $435,666 | $435,666 | $435,666 | $435,666 | $435,666 | $435,666 | $435,666 | $435,666 | $435,666 | $435,666 |
| (8) | Public Education | $50,000 | $51,150 | $52,326 | $53,530 | $54,761 | $56,021 | $57,309 | $58,627 | $59,976 | $61,355 |
| (9) | City Administrative Overhead - Single | $428,785 | $433,134 | $437,582 | $442,133 | $446,788 | $451,550 | $456,422 | $461,406 | $466,505 | $471,721 |
| | City Administrative Overhead - Multi | $558,891 | $563,782 | $568,787 | $573,906 | $579,144 | $584,501 | $589,982 | $595,589 | $601,325 | $607,193 |
| | **Total Expenses - Single Cart Program** | **$1,550,748** | **$1,567,118** | **$1,583,863** | **$1,600,994** | **$1,618,519** | **$1,636,447** | **$1,654,787** | **$1,673,549** | **$1,692,743** | **$1,712,378** |
| | **Total Expenses - Multi Cart Program** | **$1,850,870** | **$1,867,782** | **$1,885,084** | **$1,902,784** | **$1,920,891** | **$1,939,414** | **$1,958,363** | **$1,977,748** | **$1,997,579** | **$2,017,866** |
| **CASH FLOW** | | | | | | | | | | | |
| (10) | Net Revenue - City MRF (Single) | ($895,548) | ($890,145) | ($884,395) | ($878,283) | ($871,792) | ($864,906) | ($857,608) | ($849,880) | ($841,703) | ($833,058) |
| | Net Revenue - City MRF (Multi) | ($1,195,670) | ($1,190,810) | ($1,185,616) | ($1,180,072) | ($1,174,164) | ($1,167,873) | ($1,161,184) | ($1,154,079) | ($1,146,539) | ($1,138,546) |
| | Net Revenue - Private MRF (Single) | ($1,285,548) | ($1,293,802) | ($1,302,169) | ($1,310,650) | ($1,319,245) | ($1,327,953) | ($1,336,775) | ($1,345,709) | ($1,354,756) | ($1,363,914) |
| **COST PER MONTH** | | ($1.62) | ($1.61) | ($1.60) | ($1.59) | ($1.58) | ($1.57) | ($1.55) | ($1.54) | ($1.52) | ($1.51) |
| | | ($2.17) | ($2.16) | ($2.15) | ($2.14) | ($2.13) | ($2.12) | ($2.10) | ($2.09) | ($2.08) | ($2.06) |
| | | ($2.33) | ($2.34) | ($2.36) | ($2.37) | ($2.39) | ($2.41) | ($2.42) | ($2.44) | ($2.45) | ($2.47) |

# PRO FORMA MODEL
# CITY OF KILLEEN, TEXAS
# CURBSIDE COLLECTION ASSUMPTIONS

| Item | Input Description | Quantity | Units/Description | Comments/Source |
|---|---|---|---|---|
| **REVENUE** | | | | |
| 1 | Recyclables | $ 70 | per ton | SCS Assumption |
| 2 | Curbside Cost | | per month | Calculated by model |
| **EXPENSES** | | | | |
| 3 | Inflation Rate | 2.3% | | SCS Assumptions |
| 4 | Tipping Fee Escalation Rate | 2.3% | | SCS Assumptions |
| 5 | Transportation Cost | $0.00 | | Part of Balcones proposal |
| 6 | Regional Landfill Disposal | 39.20 | per ton | City provided |
| 7 | Labor | $17.68 | per hour (w benefits) | City provided |
| 8 | Rolling Carts | $55.00 | 96-gallon size | City provided |
| | | $50.00 | 64-gallon size | SCS Assumptions |
| | | $45.00 | 35-gallon size | SCS Assumptions |
| 9 | Truck Purchase Price | $286,000 | 6 Year replacement | City provided |
| 10 | Truck Operations Cost | $3,000 | per month | City provided |
| 11 | Public Education | $50,000 | Annual | SCS Assumptions |
| **SYSTEM** | | | | |
| 12 | Homes Per Day | 900 | | SCS Assumption |
| 13 | Homes Per Week | 20,750 | | City Provided |
| 14 | Trucks Needed | | | |
| | Primary | 6 | | SCS Assumption |
| | Spare | 1 | | SCS Assumption |
| | Single Cart Program | 48,300 | 5% inventory | SCS Assumption |
| | Multi Cart Program | | | |
| | 96 gallon | 50,715 | 100% of carts, 5% inventory | SCS Assumption |
| | 64 gallon | 26,565 | 50% of carts, 10% inventory | SCS Assumption |
| | 35 gallon | 5,313 | 10% of carts, 10% inventory | SCS Assumption |
| 15 | Total Number of Customers | 46,000 | | City Provided |
| 16 | Set Out | 14 | pounds per set out (every two weeks) | SCS Assumption |
| **ADMINISTRATIVE COST** | | | | |
| 17 | Cart Enforcement | $36,774 | Billing and Enforcement | SCS Assumption |
| 18 | City Overhead - Single Cart | 40.0% | | SCS Assumption |
| | City Overhead - Multi Cart | 45.0% | | SCS Assumption |

# PRO FORMA RATE MODEL
# CITY OF KILLEEN, TEXAS
# ACCOUNTING OPERATING EXPENSES

| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-3455-439.40-05 FULL-TIME SALARIES | | | $101,406 | $124,289 | $121,113 | $133,160 | $148,881 | | $153,348 | $156,875 | $160,483 | $164,174 | $167,950 | $171,813 |
| 540-3455-439.40-15 OVERTIME | | | $5,411 | $5,600 | $5,721 | $2,486 | $3,935 | | $4,385 | $4,486 | $4,589 | $4,694 | $4,802 | $4,913 |
| 540-3455-439.40-25 LONGEVITY | | | $617 | $809 | $853 | $1,090 | $1,780 | | $1,992 | $2,038 | $2,085 | $2,133 | $2,182 | $2,232 |
| 540-3455-439.40-70 VACATION-4TH WEEK BUYBK. | | | $0 | $0 | $0 | $0 | $1,200 | | $1,800 | $1,841 | $1,884 | $1,927 | $1,971 | $2,017 |
| 540-3455-439.41-10 OFFICE | | | $927 | $735 | $274 | $208 | $230 | | $400 | $409 | $419 | $428 | $438 | $448 |
| 540-3455-439.41-15 POSTAGE | | | $35 | $30 | $86 | $24 | $26 | | $26 | $27 | $27 | $28 | $28 | $29 |
| 540-3455-439.41-20 UNIFORMS & CLOTHING | | | $0 | $593 | $303 | $434 | $323 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3455-439.41-35 PRINT SUPPLIES | | | $0 | $339 | $150 | $0 | $0 | | $400 | $409 | $419 | $428 | $438 | $448 |
| 540-3455-439.41-60 FOOD SUPPLIES | | | $0 | $0 | $0 | $0 | $0 | | $805 | $824 | $842 | $862 | $882 | $902 |
| 540-3455-439-41-75 MEDICAL & CHEMICAL | | | $0 | $0 | $0 | $0 | $0 | | $50 | $51 | $52 | $54 | $55 | $56 |
| 540-3455-439.44-05 TELEPHONE | | | $151 | $461 | $105 | $31 | $25 | | $83 | $85 | $86 | $88 | $90 | $93 |
| 540-3455-439.44-30 TRAINING AND TRAVEL | | | $0 | $0 | $870 | $1,006 | $982 | | $1,300 | $1,330 | $1,360 | $1,392 | $1,424 | $1,457 |
| 540-3455-439.44-70 TROPHIES AND AWARDS | | | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3455-439,44-75 DUES AND MEMBERSHIPS | | | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3455-439.45-05 HOSPITAL INSURANCE | | | $10,976 | $16,118 | $15,337 | $15,544 | $18,005 | | $19,355 | $19,801 | $20,256 | $20,722 | $21,199 | $21,686 |
| 540-3455-439.45-10 RETIREMENT | | | $13,721 | $14,864 | $13,896 | $11,492 | $12,077 | | $14,376 | $14,707 | $15,045 | $15,391 | $15,745 | $16,107 |
| 540-3455-439.45-15 SOCIAL SECURITY | | | $8,080 | $9,789 | $9,573 | $10,249 | $11,570 | | $13,536 | $13,847 | $14,166 | $14,491 | $14,825 | $15,166 |
| 540-3455-439.45-20 WORKERS' COMPENSATION | | | $106 | $129 | $126 | $123 | $170 | | $251 | $257 | $263 | $269 | $275 | $281 |
| 540-3455-439.46-40 COMPUTER HARDWARE | | | $0 | $1,134 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| **TOTALS** | **$0** | **$0** | **$141,430** | **$174,889** | **$168,407** | **$175,848** | **$199,204** | | **$212,107** | **$216,986** | **$221,976** | **$227,082** | **$232,305** | **$237,648** |

# PRO FORMA RATE MODEL
# CITY OF KILLEEN, TEXAS
# RESIDENTIAL SERVICES OPERATING EXPENSES

| Expense Items | Fiscal Year | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-3460-439.40-05 FULL-TIME SALARIES | $1,039,324.83 | $1,144,714.17 | $1,217,505.53 | $1,205,155.83 | $1,307,185.05 | $1,299,906.90 | $1,320,108.10 | $1,462,433.70 | $1,496,069.67 | $1,530,479.27 | $1,565,680.30 | $1,601,690.94 | $1,638,529.83 |
| 540-3460-439.40-10 PART-TIME SALARIES | $37,003.63 | $12,950.40 | $34,334.49 | $24,213.71 | $55,337.58 | $36,399.22 | $52,601.45 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 540-3460-439.40-15 OVERTIME | $66,941.16 | $76,520.23 | $60,656.98 | $64,526.35 | $61,796.58 | $64,426.72 | $123,715.82 | $103,495.00 | $105,875.39 | $108,310.52 | $110,801.66 | $113,350.10 | $115,957.15 |
| 540-3460-439.40-25 LONGEVITY | $9,873.99 | $10,911.01 | $11,754.24 | $11,406.56 | $13,046.56 | $13,605.81 | $14,768.22 | $18,109.00 | $18,525.51 | $18,951.59 | $19,387.48 | $19,833.39 | $20,289.56 |
| 540-3460-439.40-30 INCENTIVE PAY | $7,144.50 | $7,183.50 | $6,936.00 | $6,092.00 | $7,878.00 | $7,912.50 | $7,702.50 | $9,568.00 | $9,788.06 | $10,013.19 | $10,243.49 | $10,479.09 | $10,720.11 |
| 540-3460-439.40-50 CAR ALLOWANCE | $0.00 | $0.00 | $0.00 | $0.00 | $50.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 |
| 540-3460-439.40-70 VACATION-4TH WEEK BUYBK. | $1,500.00 | $1,500.00 | $1,200.00 | $300.00 | $2,699.56 | $3,599.37 | $2,999.68 | $4,800.00 | $4,910.40 | $5,023.34 | $5,138.88 | $5,257.07 | $5,377.98 |
| 540-3460-439.41-10 OFFICE | $3,000.00 | $3,757.76 | $4,121.56 | $2,752.67 | $2,780.77 | $2,386.44 | $2,052.02 | $3,200.00 | $3,273.60 | $3,348.89 | $3,425.92 | $3,504.71 | $3,585.32 |
| 540-3460-439.41-15 POSTAGE | $299.09 | $144.77 | $82.12 | $289.40 | $51.73 | $20.00 | $82.18 | $550.00 | $562.65 | $575.59 | $588.83 | $602.37 | $616.23 |
| 540-3460-439.41-20 UNIFORMS & CLOTHING | $13,960.74 | $13,739.86 | $13,851.25 | $11,714.45 | $13,414.09 | $13,233.68 | $16,848.85 | $24,803.00 | $25,373.47 | $25,957.06 | $26,554.07 | $27,164.81 | $27,789.61 |
| 540-3460-439.41-25 SUBSCRIPTIONS | $320.45 | $74.00 | $245.00 | $74.00 | $74.00 | $0.00 | $181.00 | $350.00 | $358.05 | $366.29 | $374.71 | $383.33 | $392.14 |
| 540-3460-439.41-30 MOTOR VEHICLE SUPPLIES | $278,756.96 | $421,933.66 | $245,401.22 | $312,717.63 | $408,289.41 | $437,158.40 | $468,293.96 | $551,289.00 | $563,968.65 | $576,939.93 | $590,209.54 | $603,784.36 | $617,671.40 |
| 540-3460-439.41-35 PRINT SUPPLIES | $11,238.19 | $18,435.35 | $15,380.40 | $15,397.31 | $14,068.48 | $10,915.30 | $11,154.08 | $16,778.00 | $17,163.89 | $17,558.66 | $17,962.51 | $18,375.65 | $18,798.29 |
| 540-3460-439.41-50 FUEL SUPPLIES & WATER | $0.00 | $560.70 | $5,704.38 | $3,191.42 | $4,671.64 | $4,029.92 | $2,201.70 | $6,000.00 | $6,138.00 | $6,279.17 | $6,423.60 | $6,571.34 | $6,722.48 |
| 540-3460-439.41-60 FOOD SUPPLIES | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $0.00 | $448.92 | $2,287.00 | $2,339.60 | $2,393.41 | $2,448.46 | $2,504.77 | $2,562.38 |
| 540-3460-439.41-65 MINOR TOOLS | $392.95 | $729.48 | $943.55 | $296.63 | $252.96 | $306.56 | $376.33 | $400.00 | $409.20 | $418.61 | $428.24 | $438.09 | $448.17 |
| 540-3460-439.41-70 CLEANING SUPPLIES | $650.00 | $809.86 | $373.87 | $535.60 | $1,066.80 | $496.58 | $670.89 | $1,200.00 | $1,227.60 | $1,255.83 | $1,284.72 | $1,314.27 | $1,344.50 |
| 540-3460-439.41-75 MEDICAL & CHEMICAL | $177.89 | $144.00 | $163.50 | $6.48 | $280.00 | $0.00 | $0.00 | $600.00 | $613.80 | $627.92 | $642.36 | $657.13 | $672.25 |
| 540-3460-439.41-85 EDUCATIONAL & RECREATION | $0 | $111 | $600 | $0 | $90 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3460-439.41-87 EXTINGUISHING CHEMICALS | $459 | $0 | $190 | $387 | $0 | $0 | $0 | $600 | $614 | $628 | $642 | $657 | $672 |
| 540-3460-439.42-10 BUILDING MAINTENANCE | $0 | $0 | $0 | $0 | $0 | $0 | $7,476 | $2,100 | $2,148 | $2,198 | $2,248 | $2,300 | $2,353 |
| 540-3460-439.43-10 SMALL EQUIP REPAIR | $1,550 | $754 | $1,001 | $507 | $4,107 | $564 | $1,286 | $1,906 | $1,950 | $1,995 | $2,041 | $2,087 | $2,136 |
| 540-3460-439.43-15 MOTOR VEHICLE REPAIR | $517,844 | $558,171 | $642,361 | $656,877 | $707,806 | $682,975 | $604,945 | $650,000 | $664,950 | $680,244 | $695,889 | $711,895 | $728,268 |
| 540-3460-439.43-20 HEAT & AIR REPAIR | $300 | $300 | $3,107 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3460-439.43-25 RADIO & COMMUNICATION | $599 | $892 | $1,428 | $698 | $1,870 | $1,317 | $660 | $2,000 | $2,046 | $2,093 | $2,141 | $2,190 | $2,241 |
| 540-3460-439.43-73 REPLACEMENT DUMPSTERS | $0 | $0 | $0 | $86,653 | $117,516 | $157,478 | $134,068 | $172,437 | $176,403 | $180,460 | $184,611 | $188,857 | $193,201 |
| 540-3460-439.43-75 DUMPSTER | $1,012 | $0 | $4,984 | $0 | $2,995 | $10,993 | $3,811 | $4,342 | $4,442 | $4,544 | $4,649 | $4,756 | $4,865 |
| 540-3460-439.44-05 TELEPHONE | $5,437 | $5,290 | $6,292 | $3,925 | $3,930 | $5,959 | $4,092 | $7,249 | $7,416 | $7,586 | $7,761 | $7,939 | $8,122 |
| 540-3460-439.44-10 HIRE OF EQUIPMENT | $0 | $912 | $1,216 | $1,100 | $962 | $912 | $1,431 | $32,064 | $1,500 | $1,535 | $1,570 | $1,606 | $1,643 |
| 540-3460-439.44-25 LEGAL AND PUBLIC NOTICES | $2,738 | $2,420 | $1,372 | $1,372 | $783 | $350 | $704 | $1,187 | $1,214 | $1,242 | $1,271 | $1,300 | $1,330 |
| 540-3460-439.44-30 TRAINING AND TRAVEL | $2,876 | $3,453 | $7,570 | $5,011 | $1,587 | $1,779 | $5,761 | $6,500 | $6,650 | $6,802 | $6,959 | $7,119 | $7,283 |
| 540-3460-439.44-50 LIGHT AND POWER | $0 | $0 | $14,138 | $12,683 | $15,244 | $14,000 | $12,000 | $13,000 | $13,299 | $13,605 | $13,918 | $14,238 | $14,565 |
| 540-3460-439.44-70 TROPHIES AND AWARDS | $0 | $0 | $58 | $39 | $67 | $67 | $100 | $250 | $256 | $262 | $268 | $274 | $280 |
| 540-3460-439.44-75 DUES AND MEMBERSHIPS | $259 | $261 | $261 | $281 | $464 | $238 | $600 | $600 | $614 | $628 | $642 | $657 | $672 |
| 540-3460-439.45-05 HOSPITAL INSURANCE | $110,194 | $109,898 | $134,051 | $142,568 | $159,799 | $160,201 | $163,749 | $215,618 | $220,577 | $225,650 | $230,840 | $236,150 | $241,581 |
| 540-3460-439.45-10 RETIREMENT | $144,562 | $161,825 | $165,512 | $146,320 | $150,015 | $116,388 | $113,373 | $127,748 | $130,686 | $133,692 | $136,767 | $139,913 | $143,131 |
| 540-3460-439.45-15 SOCIAL SECURITY | $86,631 | $94,125 | $98,939 | $97,269 | $107,668 | $106,298 | $114,128 | $129,164 | $132,135 | $135,174 | $138,283 | $141,463 | $144,717 |
| 540-3460-439.45-20 WORKERS' COMPENSATION | $10,525 | $13,101 | $19,583 | $17,526 | $16,701 | $16,982 | $21,139 | $26,645 | $27,257 | $27,884 | $28,526 | $29,182 | $29,853 |
| 540-3460-439.46-07 CAPITAL IMPROVEMENTS | $0 | $0 | $0 | $0 | $0 | $0 | $3,448 | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3460-439.46-10 VEHICLE | $0 | $0 | $390 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3460-439.46-30 NEW RADIOS | $0 | $0 | $3,774 | $0 | $6,400 | $3,441 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3460-439.46-40 COMPUTER HARDWARE | $0 | $0 | $0 | $0 | $0 | $13,334 | $1,237 | $705 | $722 | $738 | $755 | $773 | $790 |
| 540-3460-439.46-45 COMPUTER SOFTWARE | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $471 | $481 | $493 | $504 | $515 | $527 |
| 540-3460-439.46-50 FURNITURE & FIXTURES | $0 | $0 | $10,665 | $0 | $0 | $0 | $3,908 | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3460-439.50-32 CONTRACT LABOR | $593 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3460-439.61-10 MOTOR VEHICLES | $192,173 | $0 | $0 | $0 | $0 | $0 | $420 | $482,804 | $493,909 | $505,269 | $516,890 | $528,778 | $540,940 |
| 540-3460-439.61-30 NEW RADIOS | $1,310 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3460-439.61-35 EQUIPMENT | $121,512 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **TOTALS** | **$2,671,158** | **$2,665,622** | **$2,736,147** | **$2,831,885** | **$3,190,946** | **$3,187,675** | **$3,222,540** | **$4,083,253** | **$4,145,866** | **$4,241,221** | **$4,338,769** | **$4,438,561** | **$4,540,648** |

# PRO FORMA RATE MODEL
# CITY OF KILLEEN, TEXAS
# COMMERCIAL SERVICES OPERATING EXPENSES

| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-3465-439.40-05 FULL-TIME SALARIES | $556,599 | $657,235 | $667,286 | $652,995 | $697,207 | $694,383 | $681,297 | | $757,485 | $774,907 | $792,730 | $810,963 | $829,615 | $848,696 |
| 540-3465-439.40-15 OVERTIME | $43,375 | $43,466 | $37,750 | $41,198 | $51,397 | $58,391 | $70,982 | | $65,125 | $75,362 | $77,095 | $78,869 | $80,682 | $82,538 |
| 540-3465-439.40-25 LONGEVITY | $4,654 | $5,325 | $5,858 | $6,321 | $7,558 | $7,842 | $8,153 | | $8,786 | $9,942 | $10,171 | $10,405 | $10,644 | $10,889 |
| 540-3465-439.40-30 INCENTIVE PAY | $3,710 | $4,503 | $5,388 | $11,189 | $6,123 | $5,888 | $5,705 | | $6,413 | $6,561 | $6,711 | $6,866 | $7,024 | $7,185 |
| 540-3465-439.40-70 VACATION-4TH WEEK BUYBK. | $300 | $300 | $0 | $600 | $1,200 | $1,752 | $1,799 | | $1,304 | $4,200 | $4,297 | $4,395 | $4,497 | $4,600 |
| 540-3465-439.41-10 OFFICE | $1,704 | $2,661 | $2,934 | $2,075 | $2,143 | $1,912 | $1,086 | | $1,473 | $1,507 | $1,541 | $1,577 | $1,613 | $1,650 |
| 540-3465-439.41-20 UNIFORMS & CLOTHING | $7,480 | $5,908 | $6,485 | $6,934 | $7,894 | $6,275 | $6,929 | | $10,192 | $10,427 | $10,667 | $10,912 | $11,163 | $11,420 |
| 540-3465-439.41-30 MOTOR VEHICLE SUPPLIES | $170,852 | $257,765 | $146,214 | $165,418 | $227,284 | $251,875 | $257,202 | | $307,465 | $314,537 | $321,771 | $329,172 | $336,743 | $344,488 |
| 540-3465-439.41-35 PRINT SUPPLIES | $267 | $1,815 | $521 | $1,162 | $433 | $584 | $93 | | $240 | $1,200 | $1,228 | $1,256 | $1,285 | $1,314 |
| 540-3465-439.41-50 FUEL SUPPLIES & WATER | $2,483 | $3,019 | $3,977 | $4,730 | $5,799 | $4,214 | $3,470 | | $1,862 | $6,544 | $6,695 | $6,848 | $7,006 | $7,167 |
| 540-3465-439.41-60 FOOD SUPPLIES | $0 | $0 | $0 | $0 | $0 | $0 | $268 | | $349 | $357 | $365 | $374 | $382 | $391 |
| 540-3465-439.41-65 MINOR TOOLS | $1,501 | $997 | $578 | $850 | $675 | $341 | $369 | | $473 | $484 | $495 | $506 | $518 | $530 |
| 540-3465-439.41-70 CLEANING SUPPLIES | $399 | $1,197 | $825 | $960 | $1,094 | $893 | $620 | | $934 | $955 | $977 | $1,000 | $1,023 | $1,046 |
| 540-3465-439.41-75 MEDICAL & CHEMICAL | $191 | $0 | $0 | $198 | $34 | $96 | $0 | | $265 | $271 | $278 | $284 | $290 | $297 |
| 540-3465-439.41-80 MECHANICAL | $1,316 | $0 | $0 | $1,000 | $0 | $0 | $875 | | $990 | $1,013 | $1,036 | $1,060 | $1,085 | $1,109 |
| 540-3465-439.41-85 EDUCATIONAL & RECREATION | $0 | $224 | $282 | $0 | $78 | $0 | $0 | | $0 | $400 | $409 | $419 | $428 | $438 |
| 540-3465-439.41-87 EXTINGUISHING CHEMICALS | $598 | | $421 | $593 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3465-439.42-20 PUMP EQUIPMENT MAINT | | $1,999 | $2,468 | $2,500 | $4,217 | $2,500 | $2,500 | | $3,804 | $3,892 | $3,981 | $4,073 | $4,167 | $4,262 |
| 540-3465-439.43-10 SMALL EQUIP REPAIR | $199 | $54 | $200 | $165 | $0 | $138 | $493 | | $177 | $181 | $185 | $190 | $194 | $199 |
| 540-3465-439.43-15 MOTOR VEHICLE REPAIR | $237,794 | $286,106 | $294,958 | $296,166 | $340,976 | $282,057 | $234,145 | | $311,207 | $318,364 | $325,687 | $333,177 | $340,841 | $348,680 |
| 540-3465-439.43-20 HEAT & AIR REPAIR | $300 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3465-439.43-25 RADIO & COMMUNICATION | $634 | $891 | $889 | $1,226 | $3,300 | $747 | $1,173 | | $472 | $1,500 | $1,535 | $1,570 | $1,606 | $1,643 |
| 540-3465-439.43-50 MACHINERY | $165 | $256 | $248 | $188 | $0 | $8 | $12 | | $272 | $278 | $284 | $291 | $298 | $304 |
| 540-3465-439.43-73 REPLACEMENT DUMPSTERS | $1,849 | $21,868 | $10,084 | $21,424 | $65,681 | $38,036 | $82,350 | | $40,138 | $50,392 | $51,551 | $52,737 | $53,950 | $55,190 |
| 540-3465-439.43-75 DUMPSTER | $14,749 | $14,848 | $14,452 | $10,343 | $9,890 | $17,324 | $16,815 | | $22,247 | $22,758 | $23,282 | $23,817 | $24,365 | $24,926 |
| 540-3465-439.44-05 TELEPHONE | $2,958 | $2,259 | $2,950 | $1,935 | $2,803 | $2,646 | $2,742 | | $3,929 | $4,020 | $4,112 | $4,207 | $4,304 | $4,402 |
| 540-3465-439.44-10 HIRE OF EQUIPMENT | $0 | $0 | $608 | $724 | $862 | $912 | $1,431 | | $1,629 | $1,667 | $1,705 | $1,744 | $1,784 | $1,826 |
| 540-3465-439.44-25 LEGAL AND PUBLIC NOTICES | $1,074 | $213 | $0 | $570 | $864 | $0 | $0 | | $430 | $1,000 | $1,023 | $1,047 | $1,071 | $1,095 |
| 540-3465-439.44-30 TRAINING AND TRAVEL | $2,436 | $1,548 | $2,405 | $1,974 | $1,355 | $1,339 | $2,404 | | $2,328 | $3,000 | $3,069 | $3,140 | $3,212 | $3,286 |
| 540-3465-439.44-50 LIGHT AND POWER | $4,242 | $6,000 | $13,903 | $8,966 | $10,163 | $13,121 | $13,400 | | $14,565 | $14,900 | $15,243 | $15,594 | $15,952 | $16,319 |
| 540-3465-439.44-70 TROPHIES AND AWARDS | $0 | $31 | $162 | $135 | $33 | $98 | $286 | | $49 | $250 | $256 | $262 | $268 | $274 |
| 540-3465-439.45-05 HOSPITAL INSURANCE | $56,084 | $59,647 | $69,999 | $78,277 | $78,146 | $78,037 | $75,957 | | $82,483 | $84,380 | $86,320 | $88,306 | $90,337 | $92,415 |
| 540-3465-439.45-10 RETIREMENT | $78,970 | $93,048 | $91,753 | $81,117 | $83,083 | $64,636 | $59,531 | | $66,700 | $68,234 | $69,803 | $71,409 | $73,051 | $74,732 |
| 540-3465-439.45-15 SOCIAL SECURITY | $45,001 | $52,832 | $52,428 | $52,413 | $56,676 | $56,789 | $56,924 | | $62,685 | $64,127 | $65,601 | $67,110 | $68,654 | $70,233 |
| 540-3465-439.45-20 WORKERS' COMPENSATION | $5,791 | $7,807 | $11,471 | $10,710 | $10,489 | $10,026 | $11,937 | | $16,259 | $16,633 | $17,015 | $17,407 | $17,807 | $18,216 |
| 540-3465-439.46-10 VEHICLE | $0 | $0 | $990 | $0 | $0 | $0 | $0 | | $120,701 | $123,477 | $126,317 | $129,222 | $132,195 | $135,235 |
| 540-3465-439.46-50 FURNITURE & FIXTURES | $0 | $0 | $7,600 | $0 | $0 | $0 | $800 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3465-439.50-32 CONTRACT LABOR | $463 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3465-439.61-10 MOTOR VEHICLES | $181,334 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3465-439.61-35 EQUIPMENT | $113,028 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| **TOTALS** | **$1,542,500** | **$1,533,823** | **$1,456,088** | **$1,465,055** | **$1,677,455** | **$1,602,859** | **$1,601,748** | | **$1,913,432** | **$1,987,719** | **$2,033,436** | **$2,080,205** | **$2,128,050** | **$2,176,995** |

# PRO FORMA RATE MODEL
# CITY OF KILLEEN, TEXAS
# RECYCLING PROGRAM OPERATING EXPENSES

| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-3470-439.40-05 FULL-TIME SALARIES | $154,045 | $156,320 | $159,848 | $158,663 | $149,064 | $193,849 | $197,466 | | $210,090 | $214,922 | $219,866 | $224,922 | $230,096 | $235,388 |
| 540-3470-439.40-10 PART-TIME SALARIES | $37,292 | $40,592 | $49,372 | $35,232 | $50,203 | $19,985 | $22,202 | | $32,679 | $33,431 | $34,200 | $34,986 | $35,791 | $36,614 |
| 540-3470-439.40-15 OVERTIME | $3,029 | $3,058 | $2,445 | $2,627 | $3,461 | $4,685 | $4,147 | | $3,377 | $3,455 | $3,534 | $3,616 | $3,699 | $3,784 |
| 540-3470-439.40-25 LONGEVITY | $1,457 | $1,543 | $1,734 | $1,778 | $1,806 | $2,323 | $2,656 | | $3,126 | $3,198 | $3,272 | $3,347 | $3,424 | $3,503 |
| 540-3470-439.40-30 INCENTIVE PAY | $540 | $540 | $540 | $540 | $540 | $540 | $540 | | $563 | $576 | $589 | $603 | $617 | $631 |
| 540-3470-439.40-70 VACATION-4TH WEEK BUYBK. | | | | $0 | $0 | $0 | $0 | | $1,212 | $1,240 | $1,268 | $1,298 | $1,327 | $1,358 |
| 540-3470-439.41-10 OFFICE | $193 | $116 | $177 | $194 | $124 | $124 | $108 | | $170 | $173 | $177 | $182 | $186 | $190 |
| 540-3470-439.41-15 POSTAGE | $8 | $14 | $11 | $10 | $9 | $19 | $0 | | $21 | $21 | $22 | $22 | $23 | $23 |
| 540-3470-439.41-20 UNIFORMS & CLOTHING | $1,744 | $1,741 | $1,758 | $1,834 | $1,596 | $1,396 | $1,715 | | $2,441 | $2,497 | $2,555 | $2,614 | $2,674 | $2,735 |
| 540-3470-439.41-25 SUBSCRIPTIONS | $74 | $74 | $74 | $74 | $74 | $74 | $74 | | $80 | $82 | $84 | $86 | $88 | $90 |
| 540-3470-439.41-30 MOTOR VEHICLE FUEL | $6,764 | $7,792 | $5,230 | $5,847 | $7,811 | $8,642 | $8,513 | | $10,707 | $10,953 | $11,205 | $11,462 | $11,726 | $11,996 |
| 540-3470-439.41-35 PRINT SUPPLIES | $573 | $471 | $617 | $124 | $70 | $322 | $166 | | $379 | $388 | $397 | $406 | $415 | $425 |
| 540-3470-439.41-50 FUEL SUPPLIES & WATER | $495 | $827 | $652 | $723 | $799 | $729 | $636 | | $824 | $843 | $862 | $882 | $902 | $923 |
| 540-3470-439.41-60 FOOD SUPPLIES | | | | $0 | $0 | $0 | $0 | | $142 | $146 | $149 | $152 | $156 | $160 |
| 540-3470-439.41-65 MINOR TOOLS | $3,541 | $2,016 | $244 | $971 | $108 | $80 | $716 | | $8,675 | $8,875 | $9,079 | $9,287 | $9,501 | $9,720 |
| 540-3470-439.41-70 CLEANING SUPPLIES | $17 | $14 | $25 | $44 | $16 | $14 | $177 | | $22 | $22 | $23 | $23 | $24 | $24 |
| 540-3470-439.41-75 MEDICAL & CHEMICAL | | $81 | $42 | $55 | $27 | $44 | $0 | | $100 | $102 | $105 | $107 | $110 | $112 |
| 540-3470-439.41-80 MECHANICAL | $1,682 | $1,654 | $1,736 | $1,759 | $1,633 | $1,786 | $1,507 | | $1,908 | $1,951 | $1,996 | $2,042 | $2,089 | $2,137 |
| 540-3470-439.41-85 EDUCATIONAL & RECREATION | $51 | | $1,419 | $18 | $648 | $0 | $75 | | $600 | $614 | $628 | $642 | $657 | $672 |
| 540-3470-439.41-90 AGRICULTURAL SUPPLIES | $33 | $9 | | $44 | $0 | $0 | $0 | | $43 | $44 | $46 | $47 | $48 | $49 |
| 540-3470-439.43-10 SMALL EQUIP REPAIR | | | $23 | $0 | $0 | $0 | $5 | | $100 | $102 | $105 | $107 | $110 | $112 |
| 540-3470-439.43-15 MOTOR VEHICLE REPAIR | $2,704 | $4,639 | $7,120 | $3,905 | $3,479 | $2,667 | $3,450 | | $5,733 | $5,864 | $5,999 | $6,137 | $6,278 | $6,423 |
| 540-3470-439.43-20 HEAT & AIR REPAIR | $87 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3470-439.43-50 MACHINERY | $5,838 | $5,112 | $2,000 | $3,907 | $2,860 | $11,093 | $9,292 | | $3,875 | $3,964 | $4,055 | $4,149 | $4,244 | $4,342 |
| 540-3470-439.44-05 TELEPHONE | $1,336 | $754 | $859 | $708 | $720 | $758 | $694 | | $873 | $893 | $913 | $934 | $956 | $978 |
| 540-3470-439.44-25 LEGAL AND PUBLIC NOTICES | $2,933 | $4,830 | $3,467 | $3,014 | $3,000 | $3,881 | $6,549 | | $7,000 | $7,161 | $7,326 | $7,494 | $7,667 | $7,843 |
| 540-3470-439.44-30 TRAINING AND TRAVEL | $1,732 | $1,056 | $1,392 | $835 | $1,017 | $1,530 | $1,215 | | $1,741 | $1,781 | $1,822 | $1,864 | $1,907 | $1,951 |
| 540-3470-439.44-50 LIGHT AND POWER | $2,866 | $2,930 | $2,860 | $2,720 | $2,724 | $2,622 | $2,618 | | $3,261 | $3,336 | $3,413 | $3,491 | $3,571 | $3,654 |
| 540-3470-439.44-70 TROPHIES AND AWARDS | $0 | $0 | $10 | $0 | $32 | $235 | $252 | | $200 | $205 | $209 | $214 | $219 | $224 |
| 540-3470-439.44-75 DUES AND MEMBERSHIPS | $165 | $145 | $20 | $490 | $248 | $740 | $374 | | $871 | $891 | $911 | $932 | $954 | $975 |
| 540-3470-439.45-05 HOSPITAL INSURANCE | $12,735 | $11,489 | $14,329 | $15,740 | $13,924 | $20,820 | $22,506 | | $21,859 | $22,361 | $22,876 | $23,402 | $23,940 | $24,491 |
| 540-3470-439.45-10 RETIREMENT | $25,462 | $26,439 | $27,390 | $22,649 | $22,121 | $18,396 | $17,447 | | $19,789 | $20,244 | $20,710 | $21,186 | $21,674 | $22,172 |
| 540-3470-439.45-15 SOCIAL SECURITY | $14,156 | $14,777 | $15,505 | $14,346 | $14,883 | $15,983 | $16,476 | | $18,247 | $18,666 | $19,096 | $19,535 | $19,984 | $20,444 |
| 540-3470-439.45-20 WORKERS' COMPENSATION | $2,442 | $2,915 | $4,284 | $3,960 | $4,284 | $4,133 | $5,081 | | $6,545 | $6,695 | $6,849 | $7,007 | $7,168 | $7,333 |
| 540-3470-439.46-10 VEHICLE | $0 | $0 | $1,298 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3470-439.46-50 FURNITURE AND FIXTURES | $0 | $0 | $0 | $0 | $0 | $0 | $0 | | $722 | $738 | $755 | $773 | $790 | $809 |
| 540-3470-439.50-32 CONTRACT LABOR | $400 | $0 | $0 | $300 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3470-439.50-40 REFUSE DISPOSAL COSTS | | $0 | $0 | $0 | $0 | $20,620 | $8,747 | | $70,000 | $71,610 | $73,257 | $74,942 | $76,666 | $78,429 |
| 540-3470-439.61-10 MOTOR VEHICLES | | $0 | $0 | $15,003 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| **TOTALS** | **$284,393** | **$291,950** | **$306,483** | **$298,114** | **$287,279** | **$338,089** | **$335,403** | | **$437,974** | **$448,047** | **$458,352** | **$468,894** | **$479,679** | **$490,711** |

# PRO FORMA RATE MODEL
# CITY OF KILLEEN, TEXAS
# TRANSFER STATION OPERATING EXPENSES

| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-3475-439.40-05 FULL-TIME SALARIES | 315,855 | 342,392 | 397,258 | 380,659 | 426,296 | 447,179 | 458,673 | | 499,954 | 511,453 | 523,217 | 535,251 | 547,561 | 560,155 |
| 540-3475-439.40-10 PART-TIME SALARIES | 9,535 | 4,274 | 6,802 | | 14,276 | 6,271 | 12,298 | | 14,804 | 15,145 | 15,493 | 15,850 | 16,214 | 16,587 |
| 540-3475-439.40-15 OVERTIME | 21,527 | 25,976 | 21,339 | 26,682 | 17,735 | 19,525 | 22,127 | | 24,815 | 25,386 | 25,970 | 26,567 | 27,178 | 27,803 |
| 540-3475-439.40-25 LONGEVITY | 4,276 | 4,763 | 5,343 | 4,512 | 6,185 | 6,564 | 7,160 | | 8,250 | 8,440 | 8,634 | 8,832 | 9,036 | 9,243 |
| 540-3475-439.40-30 INCENTIVE PAY | 800 | 1,104 | 1,104 | 1,327 | 1,440 | 1,800 | 1,800 | | 3,563 | 3,645 | 3,729 | 3,815 | 3,902 | 3,992 |
| 540-3475-439.40-70 VACATION-4TH WEEK BUYBK. | | | 0 | 0 | 600 | 1,200 | 600 | | 652 | 667 | 683 | 698 | 714 | 731 |
| 540-3475-439.41-10 OFFICE | 1,424 | 1,014 | 1,992 | 978 | 1,512 | 1,123 | 1,260 | | 1,385 | 1,417 | 1,449 | 1,483 | 1,517 | 1,552 |
| 540-3475-439.41-20 UNIFORMS & CLOTHING | 6,687 | 6,373 | 6,711 | 6,489 | 5,969 | 4,245 | 6,102 | | 6,914 | 7,073 | 7,236 | 7,402 | 7,573 | 7,747 |
| 540-3475-439.41-30 MOTOR VEHICLE SUPPLIES | 28,509 | 46,195 | 28,456 | 33,695 | 40,654 | 42,946 | 48,641 | | 55,346 | 56,619 | 57,921 | 59,253 | 60,616 | 62,010 |
| 540-3475-439.41-35 PRINT SUPPLIES | 229 | 166 | 11 | 14 | 176 | 66 | 359 | | 173 | 177 | 181 | 185 | 189 | 194 |
| 540-3475-439.41-50 FUEL SUPPLIES & WATER | 2,967 | 3,865 | 2,894 | 2,800 | 18,083 | 2,911 | 18,549 | | 23,913 | 24,463 | 25,026 | 25,601 | 26,190 | 26,792 |
| 540-3475-439.41-65 MINOR TOOLS | 1,524 | 785 | 1,040 | 1,147 | 466 | 482 | 598 | | 500 | 512 | 523 | 535 | 548 | 560 |
| 540-3475-439.41-70 CLEANING SUPPLIES | 1,629 | 1,348 | 1,380 | 1,142 | 1,498 | 1,295 | 1,398 | | 1,520 | 1,555 | 1,590 | 1,627 | 1,664 | 1,703 |
| 540-3475-439.41-75 MEDICAL & CHEMICAL | 1,772 | 1,492 | 652 | 731 | 483 | 630 | 514 | | 514 | 526 | 538 | 550 | 563 | 576 |
| 540-3475-439.41-80 MECHANICAL | 2,445 | 2,327 | 1,912 | 1,791 | 2,075 | 6,555 | 2,402 | | 7,490 | 7,662 | 7,839 | 8,019 | 8,203 | 8,392 |
| 540-3475-439.41-90 AGRICULTURAL SUPPLIES | 3,293 | 400 | 324 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| 540-3475-439.42-10 BUILDING MAINTENANCE | | | 0 | 0 | 0 | 10 | 0 | | 3,860 | 3,949 | 4,039 | 4,132 | 4,227 | 4,325 |
| 540-3475-439.42-35 FENCE MAINTENANCE | | 174 | 590 | 1,000 | 2,955 | 2,874 | 2,792 | | 1,371 | 1,402 | 1,435 | 1,468 | 1,501 | 1,536 |
| 540-3475-439.42-37 SIGN & PAINTING | 15,475 | 4,937 | 300 | 322 | 1,014 | 812 | 0 | | 107 | 109 | 111 | 114 | 117 | 119 |
| 540-3475-439.42-45 LANDFILL MAINTENANCE | 14,995 | 212,252 | 89,828 | 18,280 | 16,320 | 31,652 | 27,476 | | 45,000 | 46,035 | 47,094 | 48,177 | 49,285 | 50,419 |
| 540-3475-439.42-65 STREET MAINTENANCE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 5,000 | 5,115 | 5,233 | 5,353 | 5,476 | 5,602 |
| 540-3475-439.43-10 SMALL EQUIP REPAIR | 764 | 698 | 15 | 0 | 164 | 392 | 153 | | 189 | 193 | 198 | 202 | 207 | 212 |
| 540-3475-439.43-15 MOTOR VEHICLE REPAIR | 7,030 | 7,283 | 4,150 | 5,203 | 4,787 | 13,954 | 14,211 | | 8,000 | 8,184 | 8,372 | 8,565 | 8,762 | 8,963 |
| 540-3475-439.43-20 HEAT & AIR REPAIR | $568 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3475-439.43-25 RADIO & COMMUNICATION | $600 | $168 | $546 | $448 | $632 | $402 | $500 | | $600 | $614 | $628 | $642 | $657 | $672 |
| 540-3475-439.43-50 MACHINERY | $44,190 | $47,723 | $55,630 | $38,385 | $45,955 | $37,164 | $86,183 | | $99,296 | $58,965 | $60,321 | $61,709 | $63,128 | $64,580 |
| 540-3475-439.44-05 TELEPHONE | $16,643 | $4,870 | $4,012 | $3,376 | $3,487 | $3,487 | $3,292 | | $3,859 | $3,947 | $4,038 | $4,131 | $4,226 | $4,323 |
| 540-3475-439.44-10 HIRE OF EQUIPMENT | $26,514 | $47,983 | $64,707 | $57,211 | $61,023 | $82,093 | $61,350 | | $72,751 | $116,000 | $118,668 | $121,397 | $124,190 | $127,046 |
| 540-3475-439.44-20 PROFESSIONAL SERVICES | $24,795 | $24,318 | $12,428 | $17,155 | $21,915 | $16,088 | $7,034 | | $25,089 | $25,666 | $26,257 | $26,860 | $27,478 | $28,110 |
| 540-3475-439.44-30 TRAINING AND TRAVEL | $1,005 | $4,372 | $2,430 | $2,617 | $3,259 | $199 | $4,998 | | $4,637 | $4,744 | $4,853 | $4,964 | $5,079 | $5,195 |
| 540-3475-439.44-50 LIGHT AND POWER | $47,000 | $64,335 | $63,174 | $58,719 | $53,637 | $51,436 | $47,809 | | $57,663 | $58,989 | $60,346 | $61,734 | $63,154 | $64,606 |
| 540-3475-439.44-70 TROPHIES AND AWARDS | $172 | | $35 | $59 | | $250 | $475 | | $500 | $512 | $523 | $535 | $548 | $560 |
| 540-3475-439.45-05 HOSPITAL INSURANCE | $32,349 | $34,634 | $44,512 | $50,773 | $56,462 | $58,693 | $59,640 | | $90,000 | $92,070 | $94,188 | $96,354 | $98,570 | $100,837 |
| 540-3475-439.45-10 RETIREMENT | $45,662 | $49,531 | $55,281 | $46,988 | $50,776 | $40,651 | $38,973 | | $53,544 | $54,776 | $56,035 | $57,324 | $58,643 | $59,991 |
| 540-3475-439.45-15 SOCIAL SECURITY | $25,899 | $28,120 | $31,886 | $30,980 | $35,091 | $36,441 | $37,534 | | $41,372 | $42,323 | $43,297 | $44,293 | $45,311 | $46,353 |
| 540-3475-439.45-20 WORKERS' COMPENSATION | $3,382 | $4,245 | $6,463 | $5,578 | $5,849 | $6,150 | $7,712 | | $11,600 | $11,867 | $12,140 | $12,419 | $12,705 | $12,997 |
| 540-3475-439.46-35 EQUIPMENT | $0 | $0 | $0 | $0 | $650 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3475-439.46-40 COMPUTER HARDWARE | $0 | $0 | $0 | $0 | $0 | $0 | $0 | | $14,902 | $15,245 | $15,596 | $15,954 | $16,321 | $16,697 |
| 540-3475-439.46-45 COMPUTER SOFTWARE | $0 | $0 | $0 | $867 | $0 | $867 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3475-439.46-50 FURNITURE & FIXTURES | $0 | $0 | $0 | $0 | $349 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3475-439.50-35 REFUSE TRANSPORT COSTS | $1,301,402 | $1,293,735 | $1,094,992 | $1,162,019 | $0 | $1,176,424 | $1,246,118 | | $1,420,471 | $1,453,142 | $1,486,564 | $1,520,755 | $1,555,732 | $1,591,514 |
| 540-3475-439.50-40 REFUSE DISPOSAL COSTS | $1,732,097 | $1,651,559 | $2,234,142 | $2,392,199 | $0 | $2,220,480 | $2,364,804 | | $2,514,939 | $2,572,783 | $2,631,957 | $2,692,492 | $2,754,419 | $2,817,771 |
| 540-3475-439.60-07 BUILDING IMPROVEMENTS | $0 | $0 | $0 | $0 | $0 | $156,327 | $148,154 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3475-439.61-10 MOTOR VEHICLES | $16,648 | $0 | $0 | $0 | $0 | $0 | $0 | | $516 | $528 | $540 | $553 | $565 | $578 |
| 540-3475-439.61-35 EQUIPMENT | $2,021 | .01- | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3475-439.61-40 COMPUTER HARDWARE PURCH | $0 | .25- | $0 | $0 | $0 | $0 | $29,604 | | $14,924 | $15,267 | $15,618 | $15,978 | $16,345 | $16,721 |
| 540-3475-439.61-50 FURNITURE & FIXTURES | $25,231 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| **TOTALS** | **$3,786,913** | **$3,923,410** | **$4,242,338** | **$4,354,144** | **$901,773** | **$4,479,638** | **$4,771,292** | | **$5,139,982** | **$5,257,163** | **$5,378,078** | **$5,501,774** | **$5,628,314** | **$5,757,766** |

# PRO FORMA MODEL
# CITY OF KILLEEN, TEXAS
# MOWING

| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-3478-439.41-65 MINOR TOOLS | $0 | $0 | $0 | $0 | $0 | $0 | $14,647 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.40-05 FULL-TIME SALARIES | $202,724 | $327,881 | $461,961 | $467,329 | $493,226 | $399,886 | $451,233 | | $539,203 | $551,605 | $564,292 | $577,271 | $590,548 | $604,130 |
| 540-3478-439.40-10 PART-TIME SALARIES | $26,384 | $29,195 | $27,634 | $19,736 | $34,803 | $9,047 | $15,642 | | $18,758 | $19,189 | $19,630 | $20,082 | $20,544 | $21,016 |
| 540-3478-439.40-15 OVERTIME | $9,196 | $9,647 | $5,790 | $9,870 | $8,661 | $7,665 | $17,783 | | $13,787 | $14,104 | $14,428 | $14,760 | $15,100 | $15,447 |
| 540-3478-439.40-25 LONGEVITY | $833 | $970 | $1,355 | $2,113 | $2,913 | $3,160 | $2,554 | | $3,199 | $3,272 | $3,348 | $3,425 | $3,504 | $3,584 |
| 540-3478-439.40-30 INCENTIVE PAY | $454 | $735 | $990 | $2,033 | $2,355 | $2,170 | $2,749 | | $2,911 | $2,978 | $3,046 | $3,116 | $3,188 | $3,261 |
| 540-3478-439.40-70 VACATION PAYBACK | $0 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $600 | $614 | $628 | $642 | $657 |
| 540-3478-439.41-10 OFFICE | $1,678 | $1,358 | $1,298 | $1,528 | $1,265 | $1,746 | $1,791 | | $1,061 | $1,085 | $1,110 | $1,136 | $1,162 | $1,189 |
| 540-3478-439.41-15 POSTAGE | $0 | $0 | $0 | $0 | $0 | $0 | $437 | | $52 | $53 | $55 | $56 | $57 | $58 |
| 540-3478-439.41-20 UNIFORMS & CLOTHING | $6,994 | $13,426 | $12,703 | $10,007 | $12,428 | $9,674 | $13,758 | | $13,346 | $13,653 | $13,967 | $14,288 | $14,616 | $14,953 |
| 540-3478-439.41-30 MOTOR VEHICLE SUPPLIES | $21,126 | $38,612 | $24,047 | $25,650 | $37,252 | $30,190 | $39,996 | | $46,688 | $47,762 | $48,860 | $49,984 | $51,134 | $52,310 |
| 540-3478-439.41-35 PRINT SUPPLIES | $0 | $0 | $0 | $2 | $301 | $384 | $154 | | $316 | $324 | $331 | $339 | $346 | $354 |
| 540-3478-439.41-50 FUEL SUPPLIES & WATER | $0 | $26 | $0 | $604 | $589 | $991 | $675 | | $978 | $1,001 | $1,024 | $1,047 | $1,071 | $1,096 |
| 540-3478-439.41-60 FOOD SUPPLIES | $0 | $0 | $0 | $0 | $0 | $0 | $0 | | $650 | $665 | $680 | $696 | $712 | $728 |
| 540-3478-439.41-65 MINOR TOOLS | $9,100 | $13,729 | $13,723 | $9,847 | $8,959 | $14,336 | $0 | | $14,139 | $14,464 | $14,797 | $15,137 | $15,486 | $15,842 |
| 540-3478-439.41-70 CLEANING SUPPLIES | $5,186 | $6,137 | $3,311 | $1,515 | $3,385 | $3,711 | $4,280 | | $2,578 | $2,638 | $2,698 | $2,760 | $2,824 | $2,889 |
| 540-3478-439.41-75 MEDICAL & CHEMICAL | $413 | $697 | $1,444 | $527 | $296 | $488 | $591 | | $529 | $542 | $554 | $567 | $580 | $593 |
| 540-3478-439.41-85 EDUCATIONAL & RECREATION | $50 | $300 | $419 | $500 | $250 | $620 | $1,011 | | $408 | $417 | $427 | $436 | $446 | $457 |
| 540-3478-439.41-90 AGRICULTURAL SUPPLIES | $5,707 | $7,080 | $4,563 | $2,881 | $4,220 | $2,598 | $4,804 | | $1,346 | $1,377 | $1,408 | $1,441 | $1,474 | $1,508 |
| 540-3478-439.42-05 WALKS & DRIVES | $0 | $0 | $0 | $0 | $0 | $0 | $6,628 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.42-11 ELECTRICAL MAINTENANCE | $2,945 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.42-35 FENCE MAINTENANCE | $0 | $4,825 | $2,797 | $519 | $475 | $435 | $424 | | $465 | $476 | $487 | $498 | $510 | $521 |
| 540-3478-439.42-37 SIGN & PAINTING | $0 | $0 | $0 | $320 | $557 | $593 | $596 | | $368 | $377 | $386 | $394 | $404 | $413 |
| 540-3478-439.42-65 STREET MAINTENANCE | $0 | $0 | $0 | $2,190 | $468 | $909 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.43-10 SMALL EQUIP REPAIR | $13,306 | $12,624 | $14,882 | $15,663 | $15,543 | $15,213 | $16,481 | | $13,229 | $13,534 | $13,845 | $14,163 | $14,489 | $14,822 |
| 540-3478-439.43-15 MOTOR VEHICLE REPAIR | $9,280 | $14,619 | $13,382 | $12,914 | $9,949 | $13,747 | $12,927 | | $14,023 | $14,345 | $14,675 | $15,013 | $15,358 | $15,711 |
| 540-3478-439.43-25 RADIO & COMMUNICATION | $152 | $184 | $302 | $0 | $14 | $415 | $394 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.43-50 MACHINERY | $27,349 | $21,137 | $15,258 | $21,029 | $14,939 | $14,617 | $15,268 | | $11,611 | $11,878 | $12,151 | $12,431 | $12,716 | $13,009 |
| 540-3478-439.44-05 TELEPHONE | $2,519 | $3,204 | $3,600 | $2,336 | $2,737 | $2,748 | $2,771 | | $2,558 | $2,616 | $2,677 | $2,738 | $2,801 | $2,866 |
| 540-3478-439.44-10 HIRE OF EQUIPMENT | $0 | $0 | $0 | $0 | $0 | $3,045 | $8,577 | | $11,909 | $12,183 | $12,463 | $12,749 | $13,043 | $13,343 |
| 540-3478-439.44-20 PROFESSIONAL SERVICES | $0 | $4,600 | $10,400 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.44-30 TRAINING AND TRAVEL | $629 | $1,578 | $1,802 | $941 | $947 | $1,052 | $1,422 | | $1,030 | $1,054 | $1,078 | $1,103 | $1,129 | $1,155 |
| 540-3478-439.44-50 LIGHT AND POWER | $0 | $0 | $565 | $2,154 | $2,641 | $2,729 | $5,043 | | $4,891 | $5,004 | $5,119 | $5,237 | $5,357 | $5,480 |
| 540-3478-439.44-75 DUES AND MEMBERSHIPS | $80 | $0 | $0 | $0 | $0 | $0 | $64 | | $439 | $449 | $460 | $470 | $481 | $492 |
| 540-3478-439.45-05 HOSPITAL INSURANCE | $20,295 | $30,921 | $61,167 | $75,315 | $76,925 | $61,669 | $64,892 | | $90,925 | $93,016 | $95,156 | $97,344 | $99,583 | $101,874 |
| 540-3478-439.45-10 RETIREMENT | $26,450 | $43,937 | $60,251 | $54,342 | $56,941 | $34,647 | $36,749 | | $44,449 | $45,471 | $46,517 | $47,587 | $48,681 | $49,801 |
| 540-3478-439.45-15 SOCIAL SECURITY | $17,754 | $27,777 | $37,463 | $37,500 | $40,026 | $31,461 | $36,980 | | $43,670 | $44,674 | $45,701 | $46,753 | $47,828 | $48,928 |
| 540-3478-439.45-20 WORKERS' COMPENSATION | $1,953 | $3,512 | $6,656 | $6,308 | $7,124 | $4,893 | $6,578 | | $9,871 | $10,098 | $10,330 | $10,568 | $10,811 | $11,059 |
| 540-3478-439.46-10 VEHICLE | $0 | $0 | $390 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.46-35 EQUIPMENT | $0 | $0 | $0 | $1,625 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.46-40 COMPUTER HARDWARE | $0 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.46-45 COMPUTER SOFTWARE | $0 | $0 | $0 | $0 | $0 | $192 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.46-50 FURNITURE & FIXTURES | $0 | $0 | $2,863 | $2,460 | $0 | $2,044 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3478-439.50-32 CONTRACT LABOR | $0 | $1,980 | $1,000 | $975 | $1,410 | $1,950 | $2,550 | | $4,348 | $4,448 | $4,550 | $4,655 | $4,762 | $4,871 |
| 540-3478-439.61-10 MOTOR VEHICLES | $0 | $1 | $0 | $0 | $0 | $0 | $55,382 | | $48,838 | $49,961 | $51,110 | $52,286 | $53,489 | $54,719 |
| 540-3478-439.61-35 EQUIPMENT | $46,423 | $0 | $0 | $0 | $0 | $0 | $5,751 | | $0 | $0 | $0 | $0 | $0 | $0 |
| **TOTALS** | **$458,980** | **$620,691** | **$792,013** | **$790,733** | **$841,598** | **$679,024** | **$851,581** | | **$962,573** | **$985,312** | **$1,007,974** | **$1,031,158** | **$1,054,874** | **$1,079,136** |

# PRO FORMA RATE MODEL
# CITY OF KILLEEN, TEXAS
# DEBT SERVICE

| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-3480-439.50-07 EXPENSE | $0 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3480-439.50-37 BOND INTEREST | $0 | $379,398 | $0 | $436,672 | $417,077 | $400,859 | ($416) | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3480-439.50-47 BANK FEES | $2,000 | $0 | $0 | $0 | $0 | $0 | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-3480-439.50-52 DEBT SERVICE TRANSFER | $735,000 | $0 | $774,000 | $49,447 | $0 | $25 | $717,058 | | $729,558 | $722,008 | $723,358 | $721,658 | $721,295 | $725,370 |
| **TOTALS** | **$737,000** | **$379,398** | **$774,000** | **$742,644** | **$417,077** | **$742,644** | **$716,642** | | **$729,558** | **$722,008** | **$723,358** | **$721,658** | **$721,295** | **$725,370** |

# PRO FORMA RATE MODEL
# CITY OF KILLEEN, TEXAS
# HUMAN RESOURCES OPERATING EXPENSES

| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-9507-418.41-75 MEDICAL AND CHEMICAL | | | | | | | $5,000 | | $5,000 | $5,115 | $5,233 | $5,353 | $5,476 | $5,602 |
| 540-9507-418.44-25 LEGAL AND PUBLIC NOTICES | | | | | | | $2,700 | | $2,700 | $2,762 | $2,826 | $2,891 | $2,957 | $3,025 |
| 540-9507-418.50.70 UNEMPLOYMENT REIMBURSE | | | | | | | $6,300 | | $6,300 | $6,445 | $6,593 | $6,745 | $6,900 | $7,059 |
| **TOTALS** | | | | | | | **$14,000** | | **$14,000** | **$14,322** | **$14,651** | **$14,988** | **$15,333** | **$15,686** |

# PRO FORMA RATE MODEL
# CITY OF KILLEEN, TEXAS
# INFORMATION TECHNOLOGY OPERATING EXPENSES

| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-9508-439.41-40 COMPUTER SUPPLIES | | | | | | | $14,000 | | $14,000 | $14,322 | $14,651 | $14,988 | $15,333 | $15,686 |
| 540-9508-439.42-43 COMPUTER MAINTENANCE | | | | | | | $34,339 | | $34,339 | $38,310 | $39,191 | $40,093 | $41,015 | $41,958 |
| 540-9508-439.43-40 COMPUTER HARDWARE | | | | | | | $16,000 | | $16,000 | $13,000 | $13,299 | $13,605 | $13,918 | $14,238 |
| 540-9508-439.44-20 PROFESSIONAL SERVICES | | | | | | | $3,613 | | $3,613 | $3,696 | $3,781 | $3,868 | $3,957 | $4,048 |
| 540-9508-439.46-40 COMPUTER HARDWARE | | | | | | | $31,326 | | $31,326 | $30,574 | $31,277 | $31,997 | $32,732 | $33,485 |
| 540-9508-439.46-45 COMPUTER SOFTWARE | | | | | | | $7,000 | | $7,000 | $7,161 | $7,326 | $7,494 | $7,667 | $7,843 |
| 540-9508-439-61-40 COMPUTER HARDWARE PURCHASE | | | | | | | $10,153 | | $10,153 | $10,387 | $10,625 | $10,870 | $11,120 | $11,376 |
| 540-9508-439-62-45 COMPUTER SOFTWARE PURCHASE | | | | | | | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| **TOTALS** | | | | | | | **$116,431** | | **$116,431** | **$119,109** | **$120,151** | **$122,914** | **$125,741** | **$128,634** |

# PRO FORMA RATE MODEL
# CITY OF KILLEEEN, TEXAS
# GENERAL ADMINISTRATION OPERATING EXPENSES

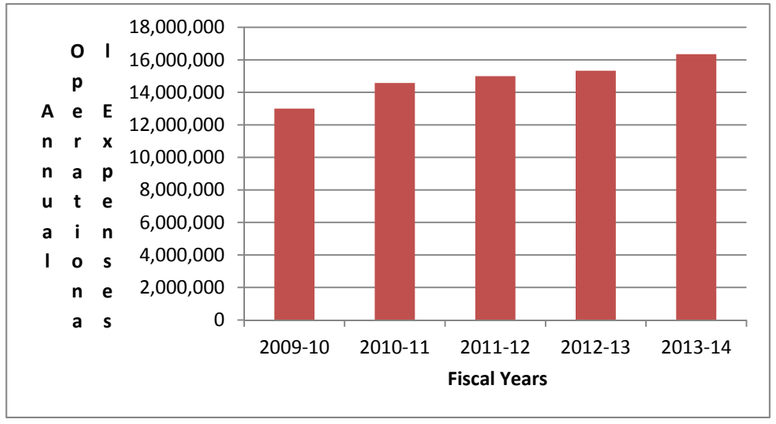
| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-9535-415.41-70 CLEANING SUPPLIES | | | | | | | $3,000 | | $3,000 | $3,069 | $3,140 | $3,212 | $3,286 | $3,361 |
| 540-9535-415.42-10 BUILDING MAINTENANCE | | | | | | | $6,000 | | $6,000 | $6,138 | $6,279 | $6,424 | $6,571 | $6,722 |
| 540-9535-415.42-11 ELECTRICAL MAINTENANCE | | | | | | | $3,500 | | $3,500 | $3,581 | $3,663 | $3,747 | $3,833 | $3,921 |
| 540-9535-415.43-20 HEAT & AIR REPAIR | | | | | | | $10,000 | | $10,000 | $10,230 | $10,465 | $10,706 | $10,952 | $11,204 |
| **TOTALS** | | | | | | | **$22,500** | | **$22,500** | **$23,018** | **$23,547** | **$24,088** | **$24,643** | **$25,209** |

# PRO FORMA MODEL
# CITY OF KILLEEN, TEXAS
# SUPPORT SERVICES

| Expense Items | Fiscal Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | | | | | | | | Projected | | | | | |
| | 2006-07 | 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-13 | | 2013-14 | 2014-15 | 2015-16 | 2016-17 | 2017-18 | 2018-19 |
| 540-9595-439.44-15 INSURANCE | | | | | | | $76,304 | | $76,558 | $78,319 | $80,120 | $81,963 | $83,848 | $85,777 |
| 540-9595-439.44-20 PROFESSIONAL SERVICES | | | | | | | $121,918 | | $121,918 | $124,722 | $127,591 | $130,525 | $133,527 | $136,599 |
| 540-9595-439.44-45 PUBLIC LIAB INSURANCE | | | | | | | $32,457 | | $31,639 | $32,367 | $33,111 | $33,873 | $34,652 | $35,449 |
| 540-9595-439.44-62 INDIRECT COST ALLOCATION | | | | | | | $1,235,124 | | $1,308,745 | $1,338,846 | $1,369,640 | $1,401,141 | $1,433,368 | $1,466,335 |
| 540-9595-439.44-82 GENERAL FUND FRANCHISE FEE | | | | | | | $1,094,222 | | $1,130,119 | $1,156,112 | $1,182,702 | $1,209,904 | $1,237,732 | $1,266,200 |
| 540-9595-439.44-85 CLAIMS AND DAMAGES | | | | | | | $80,568 | | $45,000 | $46,035 | $47,094 | $48,177 | $49,285 | $50,419 |
| 540-9595-439.50-12 YEAR END SALARY ACCRUAL | | | | | | | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-9595-439.50-90 BAD DEBTS | | | | | | | $0 | | $0 | $0 | $0 | $0 | $0 | $0 |
| 540-9595-439.96-01 PARKING LOT IMPROV | | | | | | | $324,482 | | $0 | $0 | $0 | $0 | $0 | $0 |
| **TOTALS** | | | | | | | **$2,965,075** | | **$2,713,979** | **$2,776,401** | **$2,840,258** | **$2,905,584** | **$2,972,412** | **$3,040,778** |

# PRO FORMA MODEL
# CITY OF KILLEEN, TEXAS
# HISTORICAL OPERATIONAL COSTS

| FISCAL YEAR | 2009-10 | 2010-11 | 2011-12 | 2012-13 | 2013-14 |
|---|---|---|---|---|---|
| TOTALS | 12,996,765 | 14,575,152 | 14,998,258 | 15,327,994 | 16345788.36 |



# PRO FORMA MODEL
# CITY OF KILLEEN, TEXAS
# DEBT SERVICE SCHEDULE

| Year | Debt Service |
|---|---|
| 2014-15 | $722,008 |
| 2015-16 | $723,358 |
| 2016-17 | $721,658 |
| 2017-18 | $721,295 |
| 2018-19 | $725,370 |
| 2019-20 | $727,035 |
| 2020-21 | $721,035 |
| 2021-22 | $724,085 |
| 2022-23 | $725,795 |
| 2023-24 | $731,195 |
| 2024-25 | $730,085 |
| 2025-26 | $727,647 |
| 2026-27 | $733,872 |
| 2027-28 | $733,423 |
| 2028-29 | $731,438 |
| 2029-30 | $573,038 |

**City of Killeen, Texas**

Aggregate Solid Waste Supported Debt Service

## Aggregate Debt Service

Part 1 of 2

| Date | Principal | Interest | Total P+I | Fiscal Total |
|---|---|---|---|---|
| 09/30/2014 | - | - | - | - |
| 02/01/2015 | - | 171,128.75 | 171,128.75 | - |
| 08/01/2015 | 380,000.00 | 170,878.75 | 550,878.75 | - |
| 09/30/2015 | - | - | - | 722,007.50 |
| 02/01/2016 | - | 166,678.75 | 166,678.75 | - |
| 08/01/2016 | 390,000.00 | 166,678.75 | 556,678.75 | - |
| 09/30/2016 | - | - | - | 723,357.50 |
| 02/01/2017 | - | 160,828.75 | 160,828.75 | - |
| 08/01/2017 | 400,000.00 | 160,828.75 | 560,828.75 | - |
| 09/30/2017 | - | - | - | 721,657.50 |
| 02/01/2018 | - | 153,147.50 | 153,147.50 | - |
| 08/01/2018 | 415,000.00 | 153,147.50 | 568,147.50 | - |
| 09/30/2018 | - | - | - | 721,295.00 |
| 02/01/2019 | - | 145,185.00 | 145,185.00 | - |
| 08/01/2019 | 435,000.00 | 145,185.00 | 580,185.00 | - |
| 09/30/2019 | - | - | - | 725,370.00 |
| 02/01/2020 | - | 138,517.50 | 138,517.50 | - |
| 08/01/2020 | 450,000.00 | 138,517.50 | 588,517.50 | - |
| 09/30/2020 | - | - | - | 727,035.00 |
| 02/01/2021 | - | 128,017.50 | 128,017.50 | - |
| 08/01/2021 | 465,000.00 | 128,017.50 | 593,017.50 | - |
| 09/30/2021 | - | - | - | 721,035.00 |
| 02/01/2022 | - | 117,042.50 | 117,042.50 | - |
| 08/01/2022 | 490,000.00 | 117,042.50 | 607,042.50 | - |
| 09/30/2022 | - | - | - | 724,085.00 |
| 02/01/2023 | - | 105,397.50 | 105,397.50 | - |
| 08/01/2023 | 515,000.00 | 105,397.50 | 620,397.50 | - |
| 09/30/2023 | - | - | - | 725,795.00 |
| 02/01/2024 | - | 93,097.50 | 93,097.50 | - |
| 08/01/2024 | 545,000.00 | 93,097.50 | 638,097.50 | - |
| 09/30/2024 | - | - | - | 731,195.00 |
| 02/01/2025 | - | 80,042.50 | 80,042.50 | - |
| 08/01/2025 | 570,000.00 | 80,042.50 | 650,042.50 | - |
| 09/30/2025 | - | - | - | 730,085.00 |
| 02/01/2026 | - | 66,323.75 | 66,323.75 | - |
| 08/01/2026 | 595,000.00 | 66,323.75 | 661,323.75 | - |
| 09/30/2026 | - | - | - | 727,647.50 |
| 02/01/2027 | - | 51,936.25 | 51,936.25 | - |
| 08/01/2027 | 630,000.00 | 51,936.25 | 681,936.25 | - |
| 09/30/2027 | - | - | - | 733,872.50 |

Aggregate | 7/21/2014 | 2:46 PM

Specialized Public Finance Inc.
Austin, Texas

**City of Killeen, Texas**

Aggregate Solid Waste Supported Debt Service

## Aggregate Debt Service

Part 2 of 2

| Date | Principal | Interest | Total P+I | Fiscal Total |
|---|---|---|---|---|
| 02/01/2028 | - | 36,711.25 | 36,711.25 | - |
| 08/01/2028 | 660,000.00 | 36,711.25 | 696,711.25 | - |
| 09/30/2028 | - | - | - | 733,422.50 |
| 02/01/2029 | - | 20,718.75 | 20,718.75 | - |
| 08/01/2029 | 690,000.00 | 20,718.75 | 710,718.75 | - |
| 09/30/2029 | - | - | - | 731,437.50 |
| 02/01/2030 | - | 9,018.75 | 9,018.75 | - |
| 08/01/2030 | 555,000.00 | 9,018.75 | 564,018.75 | - |
| 09/30/2030 | - | - | - | 573,037.50 |
| **Total** | **$8,185,000.00** | **$3,287,335.00** | **$11,472,335.00** | - |

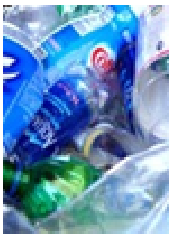
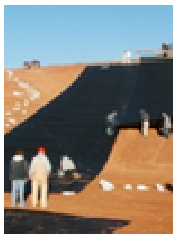
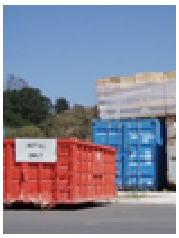
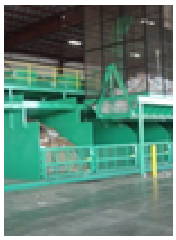
### Par Amounts Of Selected Issues

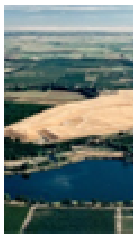
| | |
|---|---|
| 09 c/o adj (8/25) 1 -Solid Waste | 1,670,000.00 |
| 12 GO & Ref (8/16) FINAL -Refunding - Solid Waste | 6,215,000.00 |
| 14 refunding allocation - use for pricing -Solid Waste Portion | 300,000.00 |
| **TOTAL** | **8,185,000.00** |

# APPENDIX B

# SINGLE STREAM MEMORANDUM

SCS ENGINEERS



# Memorandum on Single Stream Recycling

Presented to:

City of Killeen

P.O. Box 1329
Killeen, TX 76540

Presented by:

**SCS ENGINEERS**
1901 Central Drive, Suite 550
Bedford, TX
(817) 571-2288

October 2014
Project No. 16214052.00

**Offices Nationwide**
**www.scsengineers.com**

DRAFT

# Memorandum on Single Stream Recycling

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May 12, 2014
Project No. 16214052.00

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| | The Proposed Program | 2 |
| 3 | Analysis of Proposed Recycling Program | 3 |
| | Pro Forma Model | 3 |
| | Qualitative Aspects of the Program | 3 |
| 4 | Findings and Recommendations | 5 |


## List of Exhibits


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| Exhibit 1 | Pro Forma Model Single Cart | |
| Exhibit 2 | Pro forma Model Multi Cart | |
| Exhibit 3 | Single Stream Recycling Pro Forma Model | |
| Exhibit 4 | Survey of Solid Waste Collection and Recycling Services of Selected Texas Cities | |
| Exhibit 5 | Single Cart vs Multi Cart | |

# 1 INTRODUCTION

The City of Killeen (City) is considering the implementation of a mandatory curbside recycling program to replace the existing subscription service that is currently in place for citizens. The current subscription service provides a 22-gallon bin and the customer is charged $2.48 per month. The fees charged for the service currently do not cover the costs for the City to administer the program even when the revenue that is generated by sale of recyclable materials is included.

This memorandum briefly summarizes the proposed single stream program (Program) and provides a cost analysis and preliminary recommendations regarding implementation of the system. Anticipated costs to the customer for implementing the new recycling system are presented for both single cart and multi-cart garbage collection options in conjunction with the Program.

# 2 OVERVIEW OF SINGLE STREAM RECYCLING PROPOSAL

## THE PROPOSED PROGRAM

The City is considering the implementation of the Program to replace the existing subscription recycling service that is currently in place for residents. The existing program provides curbside recycling to approximately 3600 customers. The City charges each customer $2.48 per month to provide weekly pickup of recyclables. Based on a preliminary analysis of data provided by the City, the current system costs the City significantly more than the monthly fees charged and revenue received by the sale of materials.

The City is considering the implementation of a new Program that would replace the subscription service with a City wide curbside recycling program. The new Program would include the following:

- Every other week collection of recyclables for each resident
- 96 gallon recyclable containers for each resident
- Single or multi-cart bi-weekly garbage collection
- Additional monthly fee to residents to offset the cost of the new Program

The new Program would be built upon the premise of mandatory participation by residential customers. Each existing customer will be provided with carts to use along with information on what materials will be accepted and when and how to set out the carts. Accepted materials would include the following:

- Newspaper
- Corrugated Cardboard
- Mixed Paper
- PET
- HDPE
- Other Plastics #3-7
- Aluminum Cans
- Metal Cans

The proposed Program will not accept glass bottles. This item is currently accepted with the subscription service.

The collected materials will be brought to the City's transfer station for loading and transfer to the Balcones processing facility in Austin. As provided for in the Balcones' October 24, 2013 proposal, the City will be paid a processing fee ($12.00 per ton) for use of the transfer station and providing labor and equipment to load the recyclables into Balcones' trucks for transportation. As provided for in Balcones' proposal, in later phases of operation, the City would convert the old transfer station to allow storage and transfer of recyclables from the facility. The City will be paid a revenue share of $5.00 per ton of recyclables delivered to the facility provided that the materials meet the required specifications without "significant contamination" and produce an unmarketable commodity for Balcones.

# 3 ANALYSIS OF PROPOSED RECYCLING PROGRAM

## PRO FORMA MODEL

A Pro Forma Model (Model) was developed to help assess the economic feasibility of the recyclables curbside collection program (Program). The Model predicts the projected operating revenues and expenses of the Program over a 10-year period.

Briefly, the Model uses best practices/operating assumptions for such Programs familiar to SCS Engineers, and costs of equipment (carts and automated side-loader vehicles), labor, and maintenance expenses provided by the City (Exhibits 1, 2, & 3). We then utilized assumptions for inflation, fuel, and recyclables market expansion. These assumptions should be considered conservative but reasonable based on anticipated performance by City crews.

**Predicted Results**

Using the assumptions noted above, SCS developed two different scenarios: one with single 96-gallon cart using traditional side-loader vehicles; and a second assuming the same automated side-loader vehicle but in this case allowing customers the choice of three different cart sizes (35, 64 and 96-gallon). Typically, most municipalities offering this kind of multiple cart size option program allow residents to select a single cart size at the outset of the Program and then allowing a single switch-out to an alternate size (at no cost) several months later. Further switch-outs to an alternative sized-cart are typically charged to the customers. While there are standard rules of thumb for the number of customers who ultimately switch-out their cart size, most communities have found that this “cart flexibility option” requires a larger inventory of carts to accommodate these choices.

## QUALITATIVE ASPECTS OF THE PROGRAM

The City currently offers three cart options for garbage in the City. Cart sizes are 32, 64 and 96 gallon. If single stream recycling is implemented along with the multi cart system, there will most likely be a shift from larger carts to smaller ones to offset the increased cost of recycling. The percentage of customers that would make this shift is not clear, but experience with other cities indicates that it could vary significantly. The City should plan for at least 15 to 20% migration from the 96 gallon carts down to the 64 gallon carts as some residents will look to offset the increased cost of the recycling program. A single cart system would be simpler to implement and maintain, but would not provide residents with the option to control cost. Based on our experience in other cities, it is anticipated that the continuation of the multi cart system in conjunction with the single stream recycling program will also result in increased contamination to the recycling stream as residents opt for a smaller cart than can accommodate their other normal garbage production. Accurately predicting the increase in contamination associated with a multi cart system is challenging due to limitations in this type of data.

The City of Fort Worth initiated a multi-cart “pay-as-you-throw” (PAYT) system. Over time the 64 gallon cart became the majority of the cart users with approximately 60 to 70% of all carts in this category. As with most cities,, the City of Fort Worth maintains a staff to enforce the proper use of the multi cart system, thereby promoting fairness to the City’s customers and as well as

controlling the contamination of the recycling stream. Exhibit 4 provides data on solid waste collection and recycling services in selected medium to large population cites in Texas. Most of the Cities in this size range have a single cart or bag trash collection system. Three cities including Killeen offer a multi cart PAYT system. The two other Cities offering multi-cart systems are Fort Worth and Austin.

Exhibit 5 provides a comparison of impacts to the City and customer of the single cart vs multi cart approach. Offering the same multi cart system after implementation of the recycling system would be more costly to implement due primarily to maintaining a larger cart inventory, but would allow the citizens flexibility to lower their monthly fees by recycling more and minimize the impact of the added cost of the curbside recycling program. Balancing the City's revenue to account for the reduced fees paid by the citizens for the smaller carts will entail an additional administrative workload for the City's solid waste staff.

**Exhibit 5**

| SINGLE CART VS MULTI CART RECYCLING SYSTEMS | | | | | | |
|---|---|---|---|---|---|---|
| | **Capital Cost** | **Operating Cost*** | **Recycling Impact** | **Enforcement Cost** | **Administrative** | **Customer Cost** |
| **Single** | $55/user | $xxx/Month | Less contaminating | Less | Simplified to maintain | Fixed |
| **Multi Cart** | $65-$75/user | $xxx/Month | More Contaminating | More | Increased complexity in billing | Flexible |

* Refer to Section 10 and Appendix A for Pro Forma Analysis and cost to customer.

## FINDINGS AND RECOMMENDATIONS

The preliminary review and analysis of the proposed single stream recycling program has yielded the following major findings:

- The City's average net increased cost per residential customer for adding every other week curbside recycling is estimated be approximately $1.30 (for single cart) to $2.80 per month (for multi cart).

- Customer's cost can be mitigated by allowing customers the option of selecting a smaller cart size. However, implementing a multi cart system will increase the complexity and related cost of implementation to the City.

- Revenue from recycled materials will be minimal due to costs associated with handling, shipping and processing to the nearest MRF.

- Use of the City's existing transfer station for managing recyclables may limit the existing operations and capacity of the transfer station.

- Although the Balcones' proposal includes such language as, "We invite the City to negotiate any aspect of our Proposal". There are specific provisions in Balcones' proposal that levy significant penalties to the City for contamination of recyclable materials. The City may want to give in depth consideration to such provisions.

SCS offers the following recommendation for consideration:

- Consider delaying the implementation of single stream recycling until the master planning process has been completed and options for recycling have been fully reviewed and considered along with other solid waste system issues.

# Exhibits

# SINGLE STREAM RECYCLING PROFORMA MODEL, CITY OF KILLEEN, TEXAS
## SINGLE CART

| Operating Year | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| | | | | | | | | | | | |
| **QUANTITIES** | | | | | | | | | | | |
| (1) | Recylables (Ton) | 3,777 | 3,814 | 3,852 | 3,891 | 3,930 | 3,969 | 4,009 | 4,049 | 4,089 | 4,130 |
| | | | | | | | | | | | |
| **REVENUES** | | | | | | | | | | | |
| (2) | Recyclables | 18,883 | 19,071 | 19,262 | 19,455 | 19,649 | 19,846 | 20,044 | 20,245 | 20,447 | 20,652 |
| (3) | Landfill Avoidance | 143,507 | 147,095 | 150,772 | 154,541 | 158,405 | 162,365 | 156,144 | 157,705 | 159,282 | 160,875 |
| | **Total Revenues** | **$162,390** | **$166,166** | **$170,034** | **$173,996** | **$178,054** | **$182,211** | **$176,188** | **$177,950** | **$179,729** | **$181,527** |
| | | | | | | | | | | | |
| **EXPENSES** | | | | | | | | | | | |
| (4) | Equipment O&M | 252,000 | 257,040 | 262,181 | 267,424 | 272,773 | 278,228 | 283,793 | 289,469 | 295,258 | 301,163 |
| (5) | Labor | 220,646 | 226,163 | 231,817 | 237,612 | 243,552 | 249,641 | 255,882 | 262,279 | 268,836 | 275,557 |
| (6) | Truck Amoritization | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 |
| (7) | Cart Amoritization | 239,663 | 239,663 | 239,663 | 239,663 | 239,663 | 239,663 | 239,663 | 239,663 | 239,663 | 239,663 |
| (8) | Public Education | 50,000 | 51,250 | 52,531 | 53,845 | 55,191 | 56,570 | 57,985 | 59,434 | 60,920 | 62,443 |
| (9) | City Administrative Overhead | 418,390 | 422,613 | 426,931 | 431,346 | 435,862 | 440,479 | 445,202 | 450,031 | 454,969 | 460,020 |
| | **Total Expenses** | **$1,514,366** | **$1,530,394** | **$1,546,788** | **$1,563,556** | **$1,580,707** | **$1,598,249** | **$1,616,191** | **$1,634,542** | **$1,653,313** | **$1,672,513** |
| | | | | | | | | | | | |
| **CASH FLOW** | | | | | | | | | | | |
| (10) | Net Revenue | ($1,351,976) | ($1,364,228) | ($1,376,754) | ($1,389,560) | ($1,402,653) | ($1,416,038) | ($1,440,003) | ($1,456,592) | ($1,473,584) | ($1,490,986) |
| | | | | | | | | | | | |
| **COST PER MONTH** | | ($2.71) | ($2.74) | ($2.76) | ($2.79) | ($2.82) | ($2.84) | ($2.89) | ($2.92) | ($2.96) | ($2.99) |

# SINGLE STREAM RECYCLING PROFORMA MODEL, CITY OF KILLEEN, TEXAS
## MULTI CART

| Operating Year | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| | | | | | | | | | | | |
| **QUANTITIES** | | | | | | | | | | | |
| (1) | Recylables (Ton) | 3,777 | 3,814 | 3,852 | 3,891 | 3,930 | 3,969 | 4,009 | 4,049 | 4,089 | 4,130 |
| | | | | | | | | | | | |
| **REVENUES** | | | | | | | | | | | |
| (2) | Recyclables | 18,883 | 19,071 | 19,262 | 19,455 | 19,649 | 19,846 | 20,044 | 20,245 | 20,447 | 20,652 |
| (3) | Landfill Avoidance | 143,507 | 147,095 | 150,772 | 154,541 | 158,405 | 162,365 | 156,144 | 157,705 | 159,282 | 160,875 |
| | **Total Revenues** | **$162,390** | **$166,166** | **$170,034** | **$173,996** | **$178,054** | **$182,211** | **$176,188** | **$177,950** | **$179,729** | **$181,527** |
| | | | | | | | | | | | |
| **EXPENSES** | | | | | | | | | | | |
| (4) | Equipment O&M | 252,000 | 257,040 | 262,181 | 267,424 | 272,773 | 278,228 | 283,793 | 289,469 | 295,258 | 301,163 |
| (5) | Labor | 220,646 | 226,163 | 231,817 | 237,612 | 243,552 | 249,641 | 255,882 | 262,279 | 268,836 | 275,557 |
| (6) | Truck Amoritization | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 | 333,667 |
| (7) | Cart Amoritization | 257,637 | 257,637 | 257,637 | 257,637 | 257,637 | 257,637 | 257,637 | 257,637 | 257,637 | 257,637 |
| (8) | Public Education | 50,000 | 51,250 | 52,531 | 53,845 | 55,191 | 56,570 | 57,985 | 59,434 | 60,920 | 62,443 |
| (9) | Multi-Cart Enforcement | 36,774 | 37,694 | 38,636 | 39,602 | 40,592 | 41,607 | 42,647 | 43,713 | 44,806 | 45,926 |
| (10) | City Administrative Overhead | 425,580 | 429,803 | 434,121 | 438,536 | 443,052 | 447,669 | 452,392 | 457,221 | 462,159 | 467,210 |
| | **Total Expenses** | **$1,576,305** | **$1,593,253** | **$1,610,589** | **$1,628,323** | **$1,646,463** | **$1,665,020** | **$1,684,002** | **$1,703,420** | **$1,723,284** | **$1,743,603** |
| | | | | | | | | | | | |
| **CASH FLOW** | | | | | | | | | | | |
| (11) | Net Revenue | ($1,413,915) | ($1,427,087) | ($1,440,555) | ($1,454,327) | ($1,468,409) | ($1,482,809) | ($1,507,814) | ($1,525,470) | ($1,543,554) | ($1,562,077) |
| | | | | | | | | | | | |
| **COST PER MONTH** | | ($2.84) | ($2.87) | ($2.89) | ($2.92) | ($2.95) | ($2.98) | ($3.03) | ($3.06) | ($3.10) | ($3.14) |

# SINGLE STREAM RECYCLING PROFORMA MODEL, CITY OF KILLEEN, TEXAS

| General Assumptions and Input Data | | | | |
|---|---|---|---|---|
| Item | Input Description | Quantity | Units/Description | Comments/Source |
| | **REVENUE** | | | |
| 1 | Recyclables | $5 | per ton | Balcones proposal |
| 2 | Curbside Cost | | per month | Calculated by model |
| | **EXPENSES** | | | |
| 3 | Inflation Rate | 2.5% | | SCS Assumptions |
| 4 | Tipping Fee Escalation Rate | 2.5% | | SCS Assumptions |
| 5 | Transportation Cost | $0.00 | | Part of Balcones proposal |
| 6 | Regional Landfill Disposal | 38 | per ton | City provided |
| 7 | Labor | $17.68 | per hour (w benefits) | City provided |
| 8 | Rolling Carts | $55.00 | 96-gallon size | City provided |
| | | $50.00 | 64-gallon size | SCS Assumptions |
| | | $45.00 | 35-gallon size | SCS Assumptions |
| 9 | Truck Purchase Price | $286,000 | 6 Year replacement | City provided |
| 10 | Truck Operations Cost | $3,000 | per month | City provided |
| 11 | Public Education | $50,000 | Annual | SCS Assumptions |
| | **SYSTEM** | | | |
| 12 | Homes Per Day | 900 | | SCS Assumption |
| 13 | Homes Per Week | 20,750 | | City Provided |
| 14 | Trucks Needed | | | |
| | Primary | 6 | | SCS Assumption |
| | Spare | 1 | | SCS Assumption |
| | Single Cart Program | 43,575 | 10-year amoritization; 5% inventory | SCS Assumption |
| | Dual Cart Program | | | |
| | 96 gallon | 38,346 | 10-year amoritization; 10% inventory | SCS Assumption |
| | 64 gallon | 7,190 | 10-year amoritization; 10% inventory | SCS Assumption |
| | 35 gallon | 2,397 | 10-year amoritization; 10% inventory | SCS Assumption |
| 15 | Total Number of Customers | 41,500 | | City Provided |
| 16 | Set Out | 14 | pounds per set out (every two weeks) | SCS Assumption |
| | **ADMINISTRATIVE COST** | | | |
| 17 | Cart Enforcement | 36774 | Billing and Enforcement | SCS Assumption |
| 18 | City Overhead | 40.0% | | SCS Assumption |

# APPENDIX C

# BENCH MARKING DATA

# Survey of Solid Waste Collection and Recycling Services of Selected Texas Cities (Pop. 100,000 - 800,000)

| City | 2010 Population [1] | Services Provided | | | | | | | | | | Monthly Fee | General Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Garbage | | Recycling | | Brush | | Bulky | | HHW | Other | | |
| | | Carts provided | Collection Frequency | Carts provided | Collection Frequency | Carts provided | Collection Frequency | Collection Frequency | Comments | | | | |
| **Waco** | 124,805 | 95 | 1/wk | 95 | 1/2wk | 95 | 1/2wk | on request | | | | | Blue (recycling) & green (yard waste) carts are collected on alternating weeks on same collection day as trash. Waco residents may use Cobbs Recycling Center for brush & bulky waste disposal, & extended recycling services |
| **Austin** | 790,390 | 96/64/32/24 | 1/wk | Y | 1/2wks | | 1/wk | 2/yr | | see GC | | $33.50/19.75/ 14.60/13.35 | City's HHW Facility is open to City & County residents to dispose HHW |
| **Fort Worth** | 741,206 | 96/64/32 | 1/wk | Y | 1/wk | optional | 1/wk | 1/mo | picked up w/in a week of set-out | see GC | | $22.75 / 17.75 / 12.75 | Fort Worth provides residential curbside garbage pickup 1/wk in choice of 3 brown cart sizes. City also offers weekly collection of recycling in blue carts & yard waste in green carts. Curbside garbage & recycling services provided by WM & Knight Waste Services, billed by City. Drop-off stations are open to City residents for disposal of trash, brush and recyclables |
| **El Paso** | 649,121 | 96 gal | 1/wk | 96 gal | 1/wk | | on Request | | on Request | on Request | | $16/mo or self haul | Brush/Bulk is picked up on request $35 p/5 cubic feet |
| **Corpus Christi** | 305,215 | 96 Gal | 1/wk | 96 gal | 1/wk | Picked up | scheduled | picked up | scheduled | drop off | | | Brush/Bulk is picked up on a certain schedule for certain areas |
| **Laredo** | 236,091 | 96 Gal | 1/wk | 96 gal | 1/wk | bagged | every other wk | | picked up | | | | |
| **Lubbock** | 229,573 | dumpsters | 2/wk | NA | NA | | dropoff | | dropoff | dropoff | | $15.25 | Each residential dumpster is collected 2X wk. Dumpsters that serve less than 2 homes are collected 1/wk. 4 recycling drop-off centers. 4 Citizens Convenience Stations for drop-off of items too large to fit in dumpsters |
| **Irving** | 216,290 | No, bags | 2/wk | No, bags | 1/wk | No | 1/wk | 1/wk | same day as recycling | | | | 2 attended recycling centers. Special waste collection is provided on regularly scheduled garbage collection day. HHW can be taken to City's annual Home Chemical Collection Event OR the Dallas County Home Chemical Collection Center in Dallas. |
| **Amarillo** | 190,695 | dumpsters | | | dropoff | | dropoff | dropoff | | | | | |
| **Grand Prairie** | 175,396 | bags | 2/wk | bags | 1/wk | bundle | 2/wk | 1/wk | | dropoff | | | |
| **McAllen** | 129,877 | 96 Gal | 1/wk | 96 gal | 1/wk | no | 4-6 wks | | | | | | |
| **Killeen** | 127,921 | 96/64/32 | 1/wk | Y | See GC | no | 1/wk | 1/wk | same day as trash | scheduled | | $17.50/$15.60/ $14.38 | Curbside recycling collection offered to residential customers through subscription service. The cost is $2.48 per month for 22 gal container. |
| **Denton** | 113,383 | 45/65/95 gal | 1/wk | 65 gal | 1/wk | bag | 1/wk | 1/wk p/request | | scheduled | | see GC | Rates determined by container size |
| **Midland** | 111,147 | dumpster | 2/wk | no | dropoff | no | dropoff | 1/wk | put by dumpster | dropoff | | | |
| **Abilene** | 117,063 | dumpster | 1/wk | no | dropoff | no | alley p.u. | 1/wk | alley p.u. | dropoff | | 14.35 | |
| **Beaumont** | 118,296 | 90 gal | 1/wk | see GC | 2/mo. | no | 1/wk | 2/mo | curbside | dropoff | | $0.00 | separate subscription for Recycle WM Golden Triangle $10/Bin/month |
| **Odessa** | 99,940 | dumpster | | no | dropoff | | | 2/mo | by dumpster | dropoff | | | |
| **Tyler** | 96,500 | 96 Gal | 2/wk | no | dropoff | no | p.u.2/wk | 2/yr | p.u. curbside | dropoff | | | |
| **College Station** | 93,857 | 70 gal | 1/wk | bags | 1/wk | no | p.u.1/wk | 1/wk | p.u curbside | | | $14.40 | |
| **Bryan** | 76,201 | 95 gal | 1/wk | no | dropoff | no | p.u 1/wk | | | dropoff | | | |
| **Port Arthur** | 53,818 | yes | 1/wk | no | dropoff | no | p.u. curbside | | dropoff | dropoff | | | |
| **Temple** | 69,148 | 90 gal/300 gal (alley) | 1/wk | 96 gal | 1/wk | no | curbside 2/month | curbside 2/month | | | | $16.20 | |
| **Round Rock** | 106,573 | yes | 1/wk | yes | 1/month | no | 1/wk | | | dropoff | | | |
| **Wichita Falls** | 104,553 | yes and/or dumpster | 2/wk | yes | 1/wk | no | dropoff | | dropoff | | | see GC | Minimum Monthly Fee (2 times per week):<br>Dumpster $19.55 Curb Cart $13.95<br>Carry-out : 10-50 feet $35.30 / 50-100 feet $43.30/ Over 100 feet $51.30<br>Recycling Container Fee (1 time per week): $3.00 |
| **Arllington** | 375,600 | no, Bags | 2/wk | 65 gal | 1/wk | bundle | on Request | Curbside | scheduled | Dropoff | | $12.90 | |

1. From United States Census Bureau. Population and Housing Unit Estimates. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

PAYT = "Pay as you throw" ; size containers available noted

Cart size provided

## Solid Waste Benchmarking Study for Master Plan Public Collection

| Benchmarking Partner Communities | | RESIDENTIAL | | | | | | | RECYCLING | | | YARD AND BULKY WASTE PICKUP | | | | | CUSTOMER SERVICE | ROUTING | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Collection | | Technology | Charge | Scheduling | | Have you do a routing study? If yes, did you conduct the study in-house or using a consultant? | |
| | | | | | | | | | | | | | | | | | | Yes | No |
| | | Population | Pickups Per Week Provided to Residential Customers (Solid Waste, Recycling, Yard Waste)* | Total Number of Single-Family Residential Customers | Single-Family Residential Routes Per Day | Households Served Per On-Route Hour | Annual Maintenance Cost Per Truck | Monthly Charge: $/Home | Single Can or Multiple Can or Container | Extra Charge Per Home Per Month? | Recycling Set Out Routes: Pounds Per Home Per Week | Yard Waste Limits: Limited? Unlimited? Containerized? Bagged? | Collection: - Every Week? - Every Other Week? - Other? | - Rear Loader? - Side Loader? - Claw Truck? | Charge per Pickup or Hourly Charge? | Weekly? | Number of FTE Customer Service and Accounting | Software Product: In-House or Consultant Implementation: | |
| | | | | | | | | | | | | Bulky Waste Limits: Limited? Unlimited? Containerized? Bagged? | Collection: - Every Week? - Every Other Week? - Other? | - Rear Loader? - Side Loader? - Claw Truck? | Charge per Pickup or Hourly Charge? | - 311 Call-In? - Special Software? | | | |
| TX | Killeen | 137,147 | 1-1-1 | 46,000 | 12 | 120 | $30,000-$35,000 | 17.50 - 96 gal; 15.60 - 64 gal; 14.38 - 32 gal | MultiCart | 2.48 Voluntary Subscription | 14 | YW - Bagged Only No Limits; Brush Limits <6 CY | YW - Weekly | Rear and Claw Truck | Bulk >6 cy - $7.00 CY; $20.00 Minimum Fee | Weekly | 4 | | No |
| TX | Waco | 129,030 | 1-1/2-1/2 | 35,817 | 13 | 120 | | | Single | No | | YW - Containterized; Bulk Waste < 5' X 4' X 4' | YW - Every other Week | Rear Loader; Claw Truack | Extra Charges | Call in | | | |
| TX | Amarillo | | | | | | | | | | | | | | | | | | |
| TX | Beaumont | | | | | | | | | | | | | | | | | | |
| TX | Brownsville | | | | | | | | | | | | | | | | | | |
| TX | McAllen | | | | | | | | | | | | | | | | | | |
| FL | Lakeland | 100,710 | 1-1-1 | | | | | $17.05 96 gal | Single | No | 13.16 | Limits | YW - Weekly | Rear loader | One Free Collection quarter | call in to centralized utility call | | In-House | |
| FL | Clearwater | 109,000 | SW/2, REC/1,YW/1 | 27,000 | 10 | 150 | $33,000 excluding fuel- $52,000 | $24.86 | single | $2.52 | 18,900 homes/47 lbs. per home/886,000 lbs. per week | unlimited, container or bagged | every week | REL& Claw | no additional fee | weekly collection/call in dispatch | 5 | | X |
| FL | Tampa | 333,073 | 2 solid waste, 1 recycling, 1 yard waste | 75182 | Solid Waste - 38, recycling 12, yard | 150 | $38,089.00 | $32.90 | Single | No | 13.28 pounds per home per | unlimited/containerized, bagged and bundled | Solid Waste 2x/week, yard waste and | rear loader and claw truck | bulky charged per pickup based on cubic | call in to centralized utility call | 30 for water, solid waste and wastewater | Consultant | |
| CA | Santa Monica | 89,736 | 1-1-1 *(PU schedule for SF only)* | 7,480 | 15 to 18 routes *(Routing for all side loader routes which includes SF & MF customers)* | approx 276 *(the number includes both SF & MF customers)* | Average maintenane cost per side loader $35,500 | **$35.51 *(68 gal)* - $45.87 *(95 gal)* *(Rates for SF only )* | Single | No | Average 24.25 lb. per lift *(Avg for all SL routes - includes SF, MF & some com)* | **YW** - unlimited, containerized **BW** - mostly limited, set out @ curb or alley | **YW** - Weekly **BW** - Weekly | **YW** - Side Loader & Rear Loader **BW** - Rear Loader & Stakebed Truck | **YW** - Included **BW** - No cost up to 3 PU/yr & no > 5 items /PU. $25/item thereafter | **YW** - Weekly **BW** - by appointment, billing system used to create work order | 3 | Consultant | |
| VA | Virginia Beach | 450,000 | 1-1/2-1 | 124,685 | 32 | 121 | $21,000 | 21.36 | Multiple | None | 30 | Yard Waste: 25 clear plastic bags, 4 x 4 pile of limbs | Weekly | Yard Waste: Rear Loader Bulky Waste: | No additional charge | Yard waste collected weekly | 8 | Yes: Used consultant, who used Fleet Route | |
| | Others in SWANA Database | | | | | | | | | | | | | | | | | | |

Notes:
*1-1-1, 2-1-1, etc.x.

**Santa Monica - Monthly charge for collection is for all three commodities and include bulky item collection, HHW collection and street sweeping services.

# APPENDIX D

# SINGLE STREAM RECYCLING AND C&D RECYCLING

## Materials Recovery Facility

A MRF is a facility where solid waste or recyclables are sorted to recover materials for marketing to end users such as manufacturers or sent to other recycling facilities for further processing. These facilities have been a product of continuing design improvements over the last two decades and an increasing enhancement of management techniques [ ]. Commonly, these facilities are classified on how the materials are sorted and processed:

- Dual Stream MRF
- Single Stream MRF
- Mixed Waste MRF

These are more fully discussed in the following paragraphs.

### Current State of MRFs

As shown in Figure 11, the growth of MRFs in the United States has risen substantially over the past 20 years from 40 in 1991 to an estimated 600 in 2013 [ ]. Nearly 60 percent of these are located in 11 states with the largest populations (California, Pennsylvania, New York, Florida, Minnesota, Texas, Wisconsin, New Jersey, Ohio, Illinois, and Virginia) and almost 70 percent of these are owned by private service providers, most commonly the largest United States waste haulers (Waste Management, Republic, Casella).

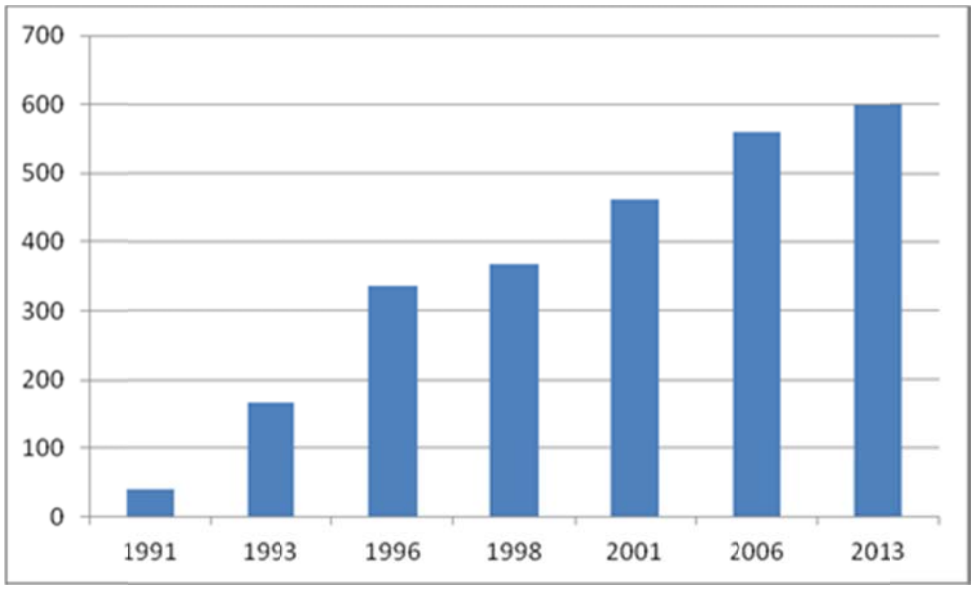


**Figure 11. Growth in U.S. MRF, 2001-2013**

Source: Reference [ ].

Newer MRFs are becoming larger to take advantage of economies of scale in operating costs. In the early 2000s, there were only a handful of MRFs processing in excess of 100,000 tons of recyclables per

year. However, in recent years, this is no longer than the exception and is quickly becoming the state-of-the-art size for newly constructed facilities. Further, the industry has seen consolidation with many of the larger firms merging or buying smaller operations to gain regional market share.

Changes in the MSW stream have had an impact on the overall design of MRFs in the United States over the past two decades. The greatest impacts have been seen in the reduction of newspapers and the increase in cardboard in the MSW stream in the United States.

The loss of advertising revenues in the United States since 2007 due to the Great Recession has had a noticeable impact on the print media world. Newspaper has traditionally been a significant component of the recyclables generated by residences, oftentimes representing 60 percent of the recyclables by weight. Several major forecasters have predicted the decline in newspaper consumption over the next several decades, suggesting that we are seeing the end of the age of print media. Figure 12 graphically portrays the reduction in the magazine and newspaper business.

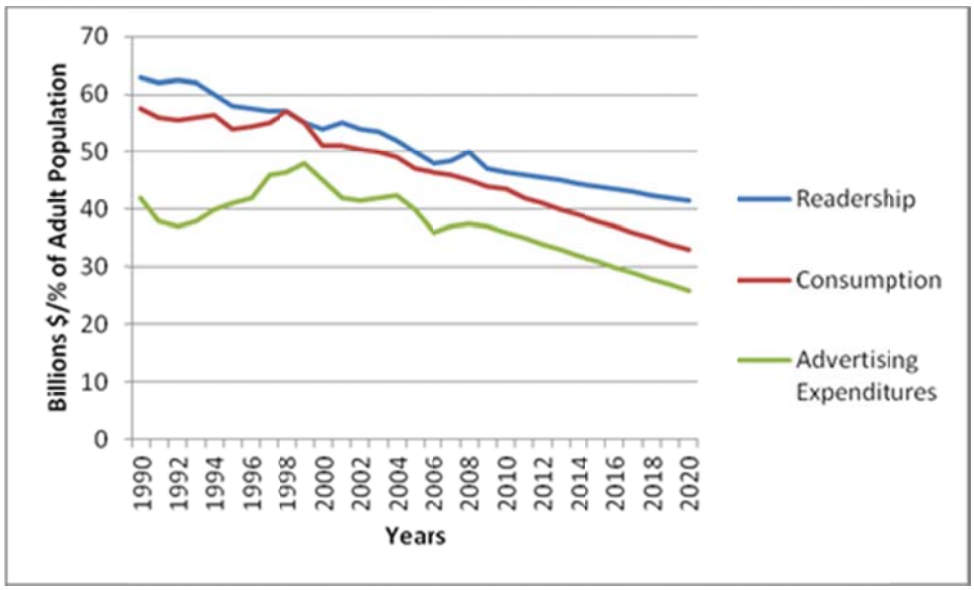


**Figure 12. U.S. Daily Newsprint Consumption, Readership and Advertising Expenditures**

Source: Reference [ ].

Figure 13 illustrates the increasing percentage of online sales as a percentage of all retail sales. With respect to MRF design, this trend represents itself in the increasing percentage of old corrugated containers (OCC) in the MSW stream as more products are shipped to residences in the United States in OCC.

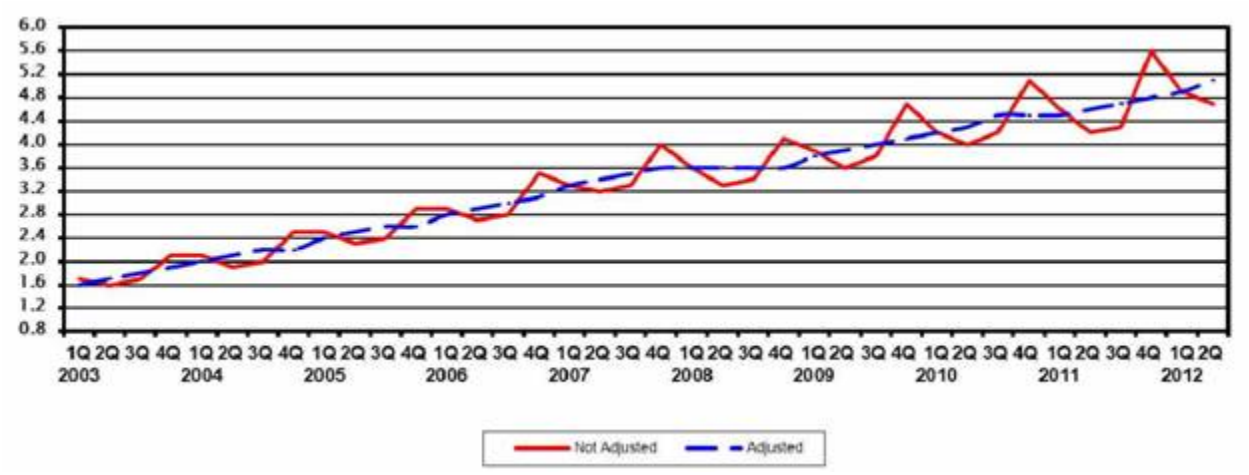


**Figure 13. Estimated Retail E-Commerce Sales As a Percent of Total Retail Sales**

Source: Reference [ ].

The MRF market in the United States is also experiencing a significant number of facility modifications to accommodate municipal preferences for single-stream recycling. Many facilities have seen additions of single stream lines or wholesale reconstruction to single stream processing only. Most industry observers suggest that approximately half of the larger United States MRFs process single stream recyclables [ ]. Baling, as well as loose transfer of single stream recyclables, for long-haul transport is widely popular in many regions to take advantage of lower operating costs of these larger "Super MRFs".

Nonetheless, the debate continues between proponents of single stream recycling and those who believe that it results in increased residue rates and reduced material quality. Many believe, that while recovered paper from single stream recycling contain higher levels of contamination than from duel stream programs, this is caused in part to the decline in the amount of olds news print and plastics in the single stream programs. Industry observers suggest that the issue of contamination in single stream MRFs will be mitigated by the improvement of separation technologies, the reduction of glass in the incoming waste stream, and extra public education efforts. Lastly, specialized industrial engineering tools such as data logging and financial controls are being included in these systems along with improved indoor working conditions.

## Standard Processing Configurations

The following paragraphs briefly describe the standard types of equipment used in most operating MRFs.

### Tipping Floor

Materials for processing are delivered to the MRF and offloaded on a paved tipping floor where they are stored inside a covered area to minimize leachate runoff and to keep materials dry. Water can significantly reduce the marketability of the recyclables, particularly paper and cardboard. MRF designers commonly size the tipping floor to accommodate two or three day supply to enable an

adequate supply of materials to either operate during non-scheduled equipment downtime, to accommodate the processing needs of a second shift, and as a buffer for holiday periods.

Not unlike other waste management facilities, MRFs utilize spotters and other laborers to help minimize offloading of potential contaminants or to remove oversize items such as cardboard. The tipping areas are also typically designed with concrete push walls to help protect the building and to help facilitate handling and storage.

**Figure 14. Tipping Floor, Outagamie County Single-Stream MRF**

Source: Phillip Stecker

### In Feed Conveyors

In many MRFs, a front-end loader is used to supply horizontal in-feed conveyors, which are placed below the tipping floor. These conveyors are connected to an incline conveyor running at a slightly faster speed to help spread out the material and deliver the incoming waste stream at a constant flow rate. Various manufacturers use a variety of metering or leveling drum feeders to help prevent surges in the presorting area.

### Presorting

The stream of recyclables is feed by the in-feed conveyor to a conveyor line, which delivers materials to a presorting area in the MRF. These areas are designed to further remove contaminants such as stacks of paper, bulky recyclables, and items that could damage downstream equipment. Manual sorters staff

work stations in this area alongside the horizontal conveyor. Materials selected are dropped through chutes into roll-off containers or storage bunkers placed directly below the sorting station.

### Disk or Star Screens

Early MRF designers incorporated different sorting lines for fiber (OCC, OCC) and containers (plastic and cans) due to their shapes, sizes, and overall density. This design also recognized that the recovery of certain items such as steel or aluminum beverage cans was enhanced when they were not buried under large piles of fiber on the conveyor lines. What has emerged over the last few decades has been the development of specialized sorting equipment to separate fiber from containers.

The emergence of single-stream MRFs having incoming comingled recyclables has required the development of disk or star screens, which consist of a series of rotating axles with a number of discus spaced along the axle. The disks (round, oval, or star-shaped) are arranged into rows and desks to form a moving bed. Nearly all of the newly constructed single-stream MRFs in the United States incorporate this kind of screening technology [ ].

Disc or star screens allow large materials to travel across the screen while smaller materials i.e., containers) fall through it. Typically, most MRFs incorporate a series of disk screens to separate various grades of paper with a primary disc screen used to separate OCC. Industry experts opine that this type of technology can remove 80 to 90 percent of the OCC from the incoming waste stream. The other screens with smaller disks are used to sort other grades of paper. Some MRFs incorporate a secondary screen, called a "polishing screen" to separate the remaining mixed paper, containers, and other residual materials.

**Figure 15. Star Screen, Outagamie County Single-Stream MRF**
Source: Phillip Stecker

## Sorting Lines

Once the fiber and containers have been sorted into essentially two different streams, they move in separate sorting lines where mechanical automation is employed as well as manual sorting. Two basic sorting methods are used in all MRFs:

- Positive sorting – Materials are pulled out of the incoming material mix.
- Negative sorting – Foreign materials and impurities are removed and the targeted material remains on the conveyor.

MRFs that "negatively sort" fiber have experienced quality-related problems when the materials have been shipped to paper mills. That is, allowing it to run off the end of the conveyor belt after other materials should have been extracted. Positive sorting fiber materials on the fiber line almost always require manual picking of OCC, ONP and oftentimes high grade paper. These materials are dropped through metal chutes into storage bunkers below for eventual baling.

Commingled containers are most often processed differently using a positive sorting approach, removing recyclables commodities and then leaving residue materials and other contaminants on the sorting conveyor. Plastics are recovered either using manual sorting or the use of disc screens or air classifiers. Further sorting is accomplished using manual sorting or magnets to recover steel cans, manual separation or eddy current systems to recover aluminum cans, glass bottles either by manual sorting or by increasingly-common, optical sorting equipment. These materials once recovered are generally dropped through chutes into storage bunkers.

## Interim Storage

Most MRF operations employ interim storage bunkers, which are located directly below or near the main sorting line. Typically, these bunkers employ some form in-floor conveyor to move the stored recovered products from the bunker to baling facilities once sufficient amounts are available for processing.

## Consolidation or Densification

The final step in MRF processing is the consolidation or densification of processed recyclable commodities. Typically, most large MRFs in the United States used baling equipment to compress materials into large, dense rectangular cubes that meet market requirements in terms of size, density, and weight. Glass crushers are used in many MRFs to produce a product with constant particle size. Also, many MRFs employ other pieces of equipment such as can flatteners and densifiers for steel and aluminum beverage cans, as well as shredders and granulators for plastic bottles.

Baling equipment is classified as either horizontal or vertical depending on the major direction of the compression ram. Horizontal balers may employ single or two rams, which translates into the number of compressions that the baler employs to produce the bales. A single-ram baler can be adjusted to produce bales of differing size. In comparison, two-ram balers produce a single size of bale, but can produce a more compressed bale than a single-ram baler and can be used for a variety of materials.

## Specialized Equipment

A variety of specialized equipment (Table 6) has been developed for further processing of materials at MRFs. These are briefly discussed in the following paragraphs.

### Bag Breakers

Incoming plastic garbage bags pose some challenges for MRF operations. These can be manually slit or can be diverted to automatic bag breakers. Several types of "bag breakers" are available, which typically have specially designed knives installed on the circumference of the drum to open the bags and release the contents. The released materials then are then diverted to the processing line. Other units include heated rods or high-speed rotating teeth.

### Trommels

Trommels are rotating drums used to separate materials by size. These drums have perforations and are set at an angle to enable gravity feed. The rotation of the trommel allows the smaller objects such as pieces of broken glass, small metal particles, and grit to fall through the holes in the perforations. The larger objects work their way down the entire length of the trommel where they exit. MRF designers specify trommels of varying length, which can range from eight to eighty feet, and varying diameters ranging in size from two to six feet.

Trommels are oftentimes used in mixed waste MRFs to remove fine particles or organics so these materials can be diverted towards a composting operation. Other applications utilize trommels to serve as bag breakers, especially if they are equipped with knives or rods, while other applications employ magnets to help remove metal objects during the tumbling action.

### Air Classifers

Air classifiers are specialized equipment that utilizes blowing air to help separate lighter weight materials such as aluminum cans and plastics from heavier weight materials like glass bottles. This equipment is "chimney like" using a large blower to such out air at the top of the stack and inducing a high-velocity air stream. The waste stream enters at the middle of the stack, where the lighter weight materials such as office paper and newsprint are extracted by the blower motor. These recyclables are then commonly collected in a cyclone separator that further sorts the materials by size and weight.

A similar type of equipment is the air clarifier, which utilizes a more precise air knife to produce high velocity airflows working in parallel to help sort the incoming materials. This type of configuration prevents swirling and remixing of the extracted materials enabling further separation of materials such as various grades of paper that differ slightly in terms of mass and density [ ].

### Eddy Current

An eddy current separator use magnets to remove nonferrous metals, primarily aluminum cans, from the incoming recyclable stream in a MRF. This equipment works by enabling magnetic rotors to spin rapidly to help develop an electric field in the nonferrous metal as it moves across the conveyor

line. The nonferrous metal develops an opposite polarity to that developed by the rotor. Consequently, the nonferrous metal is then repelled away from the rotors.

### Optical Sorters

Currently, two types of optical sorting technologies are used to sort plastics by resin and by color. In the spectroscopy equipment, light waves are emitted whereby each type of plastic on the sorting line reflected back a unique wavelength. A sensor installed on the equipment then decides how to classify the plastic into a separate category. In comparison, x-ray technology is used instead to identify the elemental form of the plastic resin. In the color separation technology, a variety of different camera equipment is used to differentiate slight variations in the color of the plastic to help separate the plastic streams.

One of the most common types of optical sorting technology used for glass separation is light spectro-photometry (LSP), which can distinguish between various colors of glass and ceramics. This equipment uses the wavelengths of the different colors to trigger a near-infrared (NIR) sensor and tell the sensor what color the glass is that is passing by. This in turn helps trigger an air blower that shoots a stream of air at the glass pushing it into the appropriate sorting bin. Manufacturers of these types of equipment claim sorting efficiency of 90 to 95 percent [ ].

**Table 1. Technologies Use to Separate PET**

| Technology | Description |
|---|---|
| Near-Infrared | Sensor uses an infrared beam to identify the plastic type by recognize a light intensity reading unique to each polymer |
| Laser | Referring to an impurity's spectrum, physical footprint, is able to detect and separate it from the product flow |
| X-Ray | Distinguishes waste based on density' useful for detecting additives |
| Color Sorting | Separates shades of color seen by the human eye for mixed bottles or flake |
| Density Separation | Flakes sink or float based on relative density to a fluid |

Source: Reference [ ].

## Types of Technologies

A "clean MRF" refers to a MRF that accepts recyclable commingled materials that have already been separated at the source from municipal solid waste generated by either residential or commercial sources. There are a variety of clean MRFs, with the most common being single stream where all recyclable material is mixed, or dual stream, where source-separated recyclables are delivered in a mixed container stream. With the advancement of automated single stream MRFs and the increasing sophistication of new material separation equipment, modern single stream facilities are "state of the

art" in terms of use of technology and ability to achieve end product quality that is acceptable to most product buyers. The worldwide market for recycled materials is continuing to evolve, and is expected to remain subject to variability in economic conditions generally, while offering opportunities for refinement and diversification of the materials that are separated. Accordingly, markets will be driven by new technical advances and ability to provide better quality of separation, which in turn will induce equipment suppliers and MRF operators to provide better equipment as prices and demand dictate.

The nation is currently trending towards single-stream recycling collection and processing facilities. Every week news articles can be found reporting a municipality or county making the switch from source-separated to single-stream. However, it is important to realize the role population plays in the decision to go source-separated as opposed to single-stream: the larger a community, the more they stand to gain from going to single-stream. The advantage of single-stream is that although source-separated has the potential to generate more income per ton due to cleaner material, the sheer volume increase associated with single-stream creates an overall economic advantage for this system. Therefore, the smaller a community, the less they have to gain from volumetric increases, and thus may choose to rely on cleaner, source-separated material to gain an economic edge, which is the strategy most used by communities in southeast Alaska, as found in Section 7.

### Dual Stream Processing Facility

In this type of MRF facility, the incoming materials are received by the facility in two streams: fiber (newspaper, corrugated cardboard, mixed paper, magazines, etc.) and commingled containers (plastic, glass, metals, and increasingly aseptic containers). Figure 14 shows an illustrative processing schematic of a duel stream MRF.

### Single Stream Processing Facility

In comparison to the duel stream MRF, incoming materials for processing are received in a "single-stream". That is, having fiber and commingled containers combined. These types of MRFs include processing equipment that separates these streams of materials into two streams (fiber and containers), which are then further processed in the facility similar to that of the dual stream MRF. Figure 15 shows an illustrative processing schematic of a single-stream MRF.

### Mixed Waste Processing Facility

Mixed Waste Processing Facilities (also referred to as a "dirty" MRF") receive mixed solid waste (meaning recyclable and non-recyclable materials, unseparated) which is sorted to separate recyclable material that is then processed. Because Mixed Waste Processing Facilities accept one unsorted stream of waste and recyclable materials, they potentially allow for lower collection costs. Capital and operating costs are typically higher than a conventional MRF due to the need for more extensive sorting equipment and labor. The potential for contamination is higher; resulting in lower quality recovered materials, as well as lower recovery rates, which can contribute to lower revenue from recyclable material sales. Mixed Waste Processing Facilities are able to achieve recovery rates of 45 percent up to 70 percent of the incoming waste as recyclable and compostable materials.

In recent years, communities are re-evaluating the development of a mixed waste MRFs because these facilities can potentially allow processing of waste streams from underserved waste generators such as multifamily and commercial businesses and increasing diversion from the landfill of potentially recyclable materials. Some of these newer mixed waste MRF facilities have been co-located at community transfer stations or landfills to tap into recyclable-rich waste streams. Other communities are evaluating the feasibility of producing high calorific, refuse-derived fuel (RDF) as a means of reducing coal use in certain industries.

The development of mixed waste MRFs is still controversial in the United States. Many still argue that sending a community's entire waste stream without source separation lacks important public responsibility. However, with increasing diversion goals being mandated, many solid waste agencies seem compelled to re-evaluate these mixed waste facilities.

**Figure 16. Processing Schematic of a Dual Stream MRF**

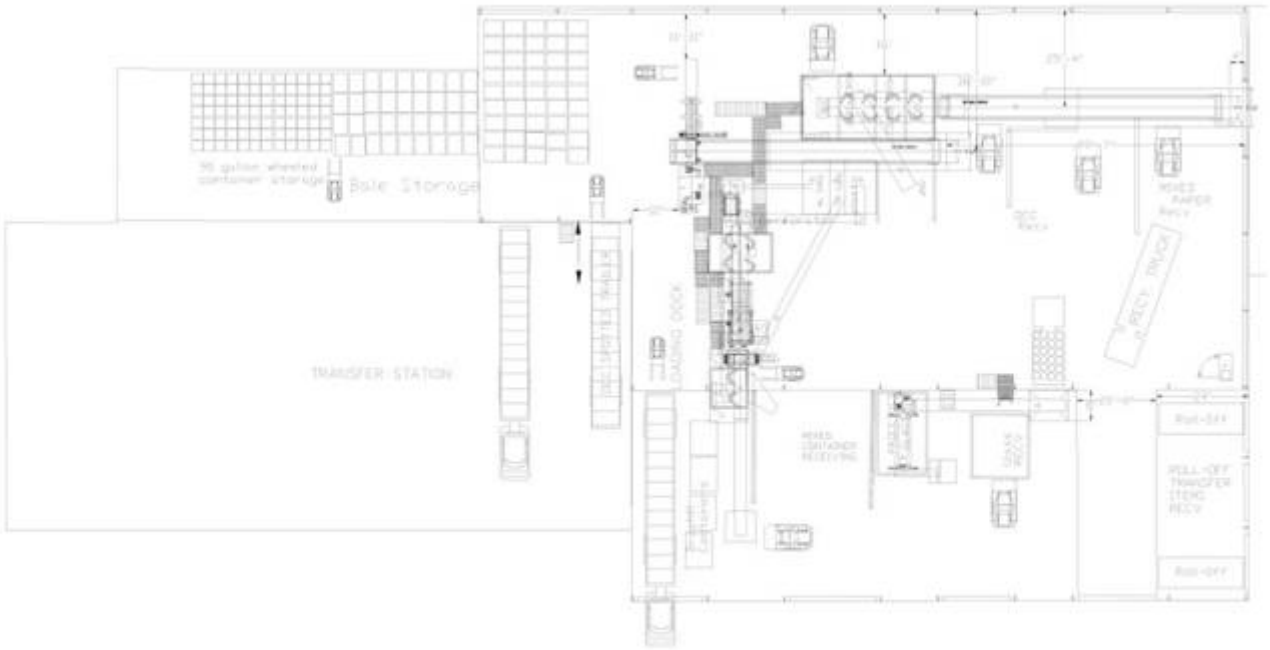

**Figure 17. Processing Schematic of a Single-Stream MRF**

**Figure 18. Processing Schematic of a Mixed Waste MRF**

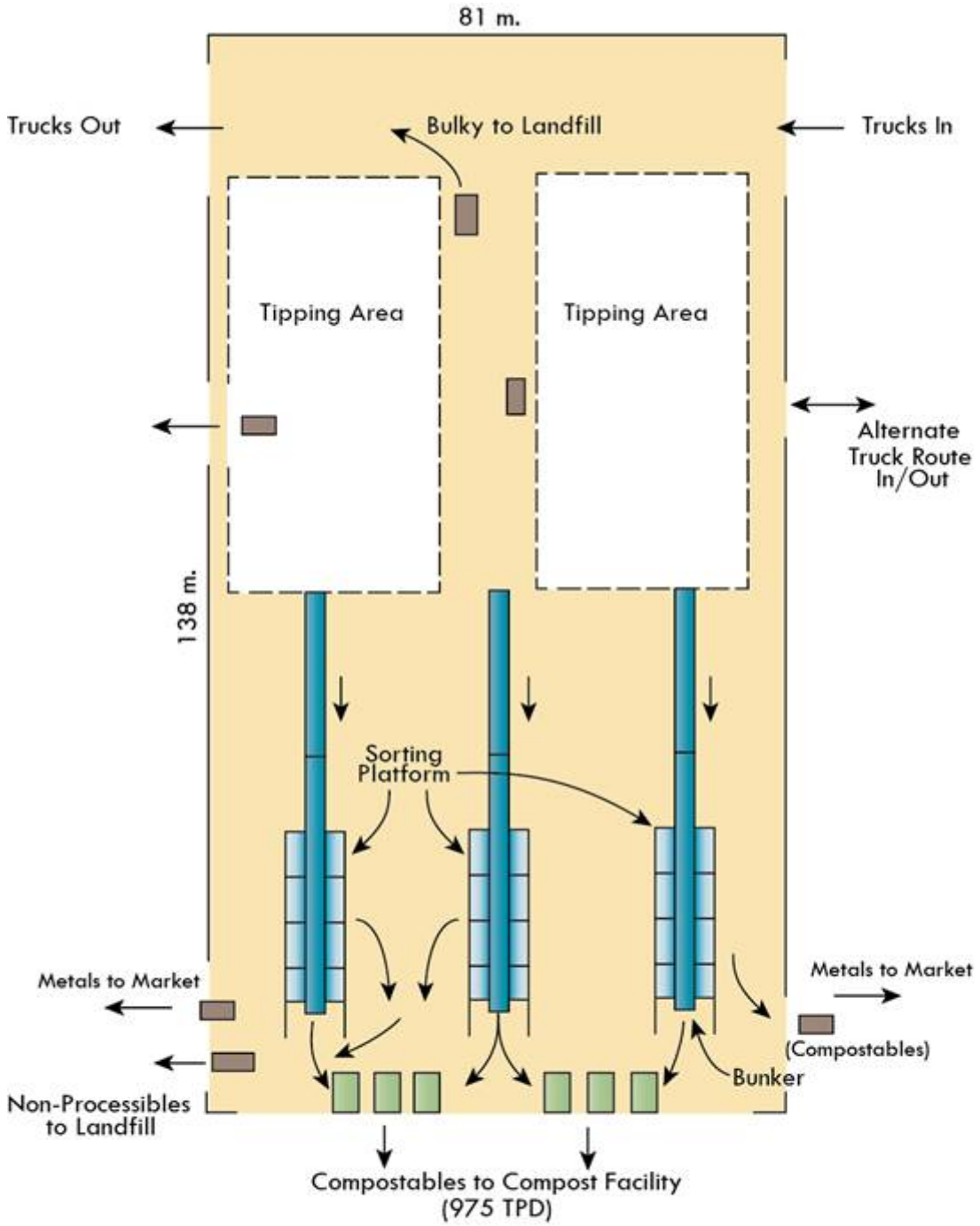

**Figure 19. Schematic of Mixed Waste MRF**

**Table 2. Differences Among MRFs in the United States**

| Criteria | Dual Stream | Single Stream | Mixed Waste |
|---|---|---|---|
| Incoming Waste Stream | Commingled containers and mixed fibers in separate streams | Commingled containers and mixed fibers in one stream; glass may be separate | Recyclables mixed with non-recyclables, preferably with organics and wet waste removed |
| Estimated % of MRF Systems | 52% | 33% | <5% |
| Average Residue Levels | With Glass: 6.7% Without Glass: 5.84% | With Glass: 11.71% Without Glass: 8.1% | Range: 25 – 75% |
| Average Throughput Per Processing Line | 137 Tons/Day | 206 Tons/Day | 400 – 2,400 Tons/Day |
| Specialized Equipment | Standard MRF Equipment | Inclined Disk Screens to Separate Fibers From Containers; Polishing Screen | Bag Breaker; Drum Separator, Trommel and/or Vibrating Screen to Separate Recyclables from MSW |
| Final Product Quality | Typically High With Minimal Contamination | Increased Risk of Cross Contamination Between Containers and Fiber | Variable Depending on Feedstock and Processing Line |
| Average Facility Size (Square Feet) | 10,000 – 50,000 | 50,000 – 150,000 | 50,000 – 200,000 |
| Average Capital Cost (2006 $) | $4,907,000 | $7,551,000 | $3 – 11 Million for Equipment Alone (2009$) |
| Average Capital Cost/Daily Ton (2006$) | $106,690 | $66,630 | N/A |

Source: Reference [ ].

## TRENDS IN MRF DESIGN

MRF design has evolved over the past several decades due to a number of important drivers, principally changes in governmental policies and expanding recyclables markets. The following major trends in MRF design are outgrowths of these developments. These are briefly discussed in the paragraphs below.

### Single Stream

The trend away from dual-stream in favor of single-stream recycling is rapidly turning into a major movement across solid waste agencies in the United States. "Single-stream" recycling refers to a

collection method in which all unsorted or commingled recyclable materials are collected in one container at the curb and placed in the collection vehicle in a commingled state until processed at a specially-design material recovery facility ("single-stream" material recovery facility). As shown in Figure 8, single-stream recycling has experienced a tremendous growth in the United States over the past decade. It is estimated that single-stream MRFs represent more than 40% of all the MRFs operating in the United States as of this date. Nearly half of these units are located in states west of Mississippi due to more stringent recycling goals.

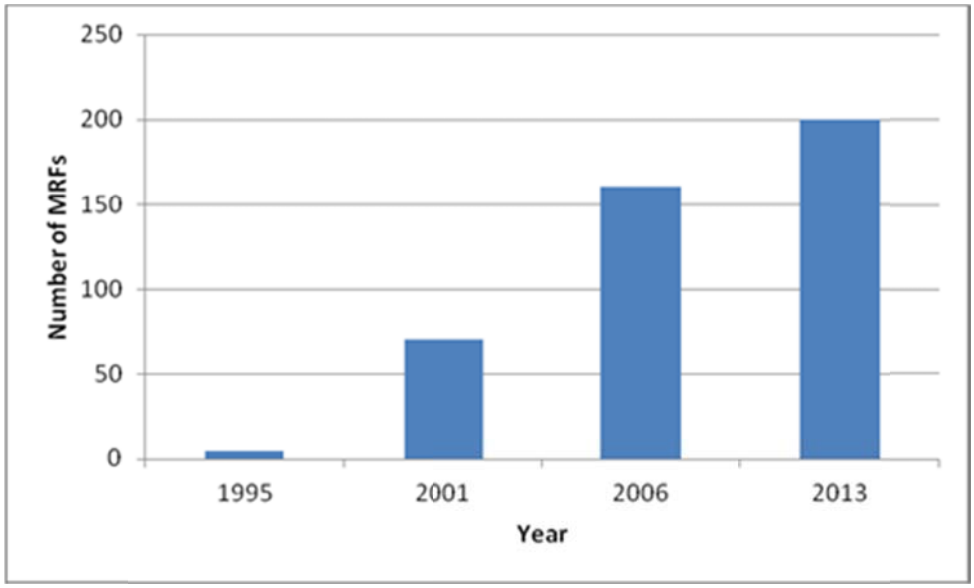


**Figure 20. Number of Single-Stream MRFs in the United States**

**Source: Reference [ ].**

## Increased Automation

With the increasing trend away from curbside source separation and the increasing numbers of recycling programs, MRFs have become more highly automated as well as increasing in design throughput capacity. Recent surveys of the recycling industry has shown more reported application of optical scanners, drum and eddy current separators, and air classifiers, as well as increasing retrofits of dual-stream systems to handle single-stream recyclables [ ]. This application of technology has resulted in a reduction of manual sorting labor on the picking lines, although manual sorters appear necessary in many facilities to ensure quality control over the recovered products.

## Larger MRFs

Figure 15 shows the trend in facility daily processed per day, which has increased significantly over the past 20 years. These data show that operators are designing MRF facilities with larger throughput capacities in mind to help take advantage of plant economies of scale and pay for the costs of automation. Facilities are becoming more "regional" in nature with recyclables oftentimes being shipped by long-haul transfer trucks or marine barges via "trans-shipment stations" to optimize the cost

of long distance transportation. The increasing market area for recyclables is necessary to pay for the increasing capital of these larger and more automated MRFs.

The increasing cost of these plants and regionalization has resulted in a sea change of plant ownership. As of this writing, only 20 percent of MRFs in the United States are publicly owned and operated [ ]. It appears that the difficulty to plan, finance, and operate these increasingly-complex plants has shifted ownership and operations of MRFs to private sector companies.

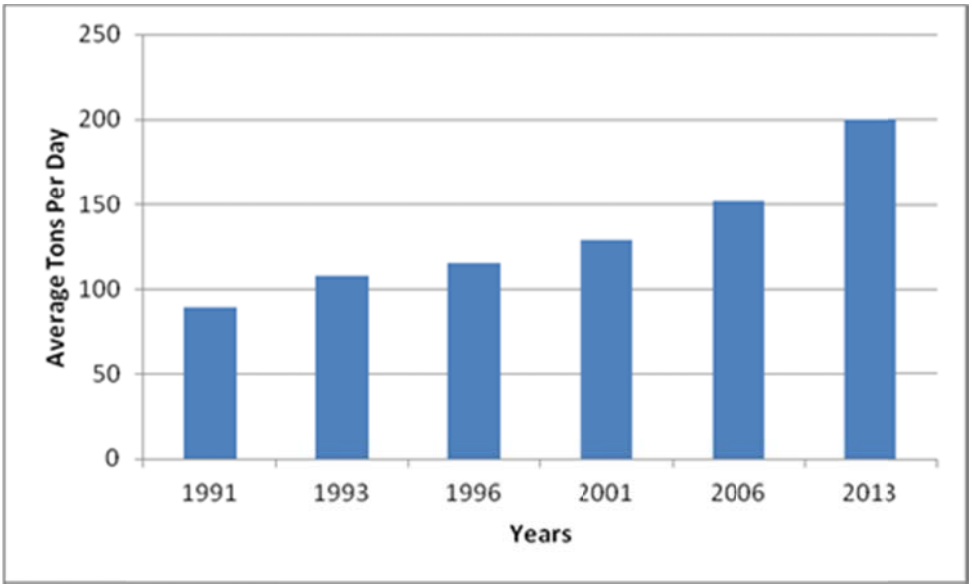


**Figure 21. Average Tons Processed Per Day, U.S. MRFs**

Source: Reference [ ].

## Mixed Waste MRFs

The primary role of this "mixed waste MRF" is to recover materials that would otherwise be landfilled, with the residue from this facility being landfilled. The solid waste industry commonly defines the term "mixed waste MRF" as a facility that accepts loads of mixed waste for the purpose of separating and diverting recyclable materials or organics from the waste stream and transferring the remaining waste for disposal.

Mixed waste MRFs, previously known as "dirty" MRFs, were initially developed in some communities during the early 1990s. Industry experience suggests that most facilities achieved low material recovery rates (five to 45 percent), had high residual rates, and experienced numerous operational and financial challenges. For these many reasons, this method was largely abandoned for construction of new facilities during the 1990s. Today, one authoritative source suggests that these mixed waste MRFs represent less than five percent of the number of operating MRFSs in the United States [ ].

In the past five years, however, a number of factors have combined to reinvigorate efforts to develop and operate mixed waste MRFs, including high energy costs, aggressive waste diversion goals, favorable commodity values, rising tip fees, and technological advancements in separation equipment. Several new facilities in California (i.e., Athens, Lincoln, and Sunnyvale) have been constructed or retrofitted

with new mechanical sorting equipment. In March 2013, the City of Houston was selected as one of five winners of Bloomberg Philanthropies' Mayors Challenge, a competition designed to spur innovation in America's cities. The City won a runner-up prize of $1 million with its proposal "One Bin for All" to allow residents to mix trash, recyclables and lawn waste in a single bin ready for automatic sorting.

## Green Building Design

Increasingly, the newest MRFs are incorporating sustainable or “green building” standards in their design and operation:

- Certified wood from responsibly managed forests.
- Building materials containing recycled content.
- Materials with zero or low amounts of volatile organic compounds.
- Energy efficient components.
- Water conserving fixtures.

Benefits of green design include: federal or state incentives and grant money, lowering operating costs, and improved public and political perception. LEED (Leadership in Energy and Environmental Design) certification, which was designed by the U.S. Green Building Council (USGBC), provides a way to verify sustainability efforts. Platinum is the highest designation given by the USGBC.

The Shoreline Recycling and Transfer Station, which is located in King County, Washington (Seattle), was awarded Platinum LEED Certification in 2008. The facility’s design incorporates many “green elements” such as: rooftop rainwater harvesting system, solar electricity panels, skylights, passive ventilation, and recycled building components.

Meeting these types of green building standards provides some added benefits as reduced operating costs, but can add capital costs to these facilities. Some designers have suggested that these features add about two to eight percent to achieve LEED certification [ ]. Consequently, some MRF owners have applied green building design principals, but have not pursued certification.

# CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING

## BACKGROUND

Construction demolition and debris (CD&D) is the material generated from the demolition of buildings and other similar civil works infrastructure, the vegetation from land clearing including rocks and soil, and the residual material from the construction of a structure. Thus, specific types of materials in CD&D could include;

- Metals – reinforcing steel, steel shapes, wire, cans, conduit, etc.
- Concrete, brick, stone, tile, rocks, and soil
- Plastics; bottles, buckets, containers, drums, wrapping, etc.
- Rope
- Paper; cardboard
- Wood and dimensional lumber, pallets
- Ceramics
- Gypsum Drywall
- Plaster
- Asphalt
- Rubber
- Foam; insulation, packing, etc.
- Adhesive, glues, paint, etc.
- Vegetation

C&DD waste presents unique recycling challenges because of its nature. C&DD is inherently a relatively dry waste that when agitated and processed produces a lot of dust. Materials can be combined and intertwined in a way that makes separating them difficult. Most of the material is bulky, heavy and/or abrasive and results in extensive wear and tear on machinery, and can also be a safety hazard to plant workers if proper controls are not observed.

Recycling of parts of demolished buildings has been conducted since the turn of the 20$^{th}$ century, for example the reuse of steel beams and columns recycled into automobile bodies, and reuse of bricks. However, several factors that emerged in the 1980s have stimulated the growth of C&DD recycling into a large and varied industry sector encompassing many other materials. These factors include:

- Sustained cycles of significant new construction in many major cities.

- The development of relatively inexpensive C&DD landfills to take residual material left-over from the recycling process.

- The emergence of other markets for recycled materials, as a result of the increased use of alternative feedstock for energy production.

- The development and refinement of automated machinery to process C&DD derived from municipal waste streams.

- Development of formal “green” building development initiatives that advocate recycling of C&DD waste.

Most C&DD recycling operations in the past relied mostly on manual labor to sort materials. The current generation of C&DD recycling facilities can consistently remove as much as 90%, or more, of the recyclable material from the waste stream, using mostly automated machinery, resulting in a very low production of residual material left-over for landfilling (Exhibit 1). Manual labor is still employed, but for specific tasks where the benefit / cost for replacing a worker with a machine that can be as effective, is not economically attractive.

**Figure 1. Construction Demolition Debris Recycling Plant**

Source: Keith Howard

## FACILITY SITING

The location of a C&DD recycling facility must take into consideration the potential for the facility to be a significant additional source of heavy truck traffic, noise, odor, wastewater (from roll-off cleaning), and dust and for these to potentially be a nuisance to the surrounding area if not properly managed. Municipal zoning laws typically restrict these types of facilities to light and heavy industrial districts where these factors typically result in less impact to surrounding properties, however, that does not mean they all become non-issues. Dust control is probably the biggest challenge to C&DD operators and still may be a problem in these industrial districts.

Being a major solid waste management facility, many of the basic principles that apply to properly siting of other major waste management facilities (i.e., transfer stations, landfills, composting, etc.), will apply as well. In addition, because the public and other businesses can potentially be adversely impacted by the new facility, they can be expected to be actively involved, and potentially influential in the facility siting process. The siting of a facility should be a carefully planned process that in addition to assessing all of the "technical" and environmental factors, likely will require engaging the public and other businesses early in the process, to alleviate concerns, garner their support, so that the project can move forward to fruition.

## C&DD WASTE PROCESSING / RECYCLING OPERATIONS

Most of the automated machinery used in current C&DD recycling plants has been derived from the basic materials mining industry and modified for the commercial market. In some cases, new equipment has been designed specifically for municipal C&DD materials. The planning and design of a recycling plant is based on many factors that include:

- Volume of C&DD material projected to be managed over the next 5 to 10 years.
- The re-use markets that exist or can be developed for recycled materials and the revenue potential.
- Location, size, and availability of property relative to the market being served.
- Development and operating budget (this includes the use of manual labor and automated equipment)

The primary goal in a C&DD recycling facility is to be highly efficient, meaning extract as much of the valuable material as possible while producing the lowest amount of residual material. For a privately owned recycling business this is strictly an economic issue. When the total cost of processing a C&DD waste to remove a specific material exceeds the revenue generated from the sale of that material to the reuse market, then the material is not valuable from a recycling standpoint. Accordingly, the disposal of residual material in the landfill is a cost to the plant operator so reducing residual disposal costs enhances the net revenue from the sale of recyclable materials.

The economic "equation" for a municipally owned / operated facility is a little different, in that this would be a public service and demonstrating a healthy "profit" is not the prime focus. However, the process efficiency goal is still the same whether the facility is private or publicly owned.

What is determined to be a valuable material can change over time as the market, and more specifically the price paid changes for various materials. Thus, the recycling plant must have some flexibility built-in to the separation process and the overall "floor plan layout" in order to be able to process a variety of valuable material and be responsive to changing markets.

## PROCESSING SCHEMES

Design of a processing system for C&DD waste follows an approach that, in general, encompasses the following basic principles listed below, starting at the waste tipping area, progressing through mechanized and manual separation then to the temporary storage areas for each targeted material. Some or all of these may be incorporated depending on the factors previously mentioned. Keep in mind there are many different technologies and equipment that can accomplish your goals and we could not cover them all. We have only described herein a few proven techniques.

A schematic illustrating the basic material separation and flow processes is provided in Exhibit 2. Following along with that exhibit, the descriptions below correspond to the letters designating certain features on the exhibit;

- Initial agitation to start to separate the mix of material to improve productivity of downstream processing operations (B)

- Separation of smaller material from larger material. This split usually is around an approximate diameter of 8 inches to 12 inches (20 to 30 cm.) (B).

- Separation of ferrous metal to prevent damage to downstream equipment (D)

- Separation of small stones, glass pieces, sand and grit to reduce wear and tear on downstream equipment (E).

- Separation of light, “two-dimensional” materials (i.e., paper, cardboard, and plastic film products) from smaller and/or denser “three-dimensional” materials (i.e., small containers, bottles, other objects, pieces of non-ferrous metal, sticks of wood, etc.) (F).

- Separation of wood / lumber, either with optical machinery (J) or water bath.

- Separation of non-ferrous metal, other wood, concrete pieces, asphalt, drywall, etc. This is usually done manually on a "picking line" conveyor system (described below) (C, G and I).

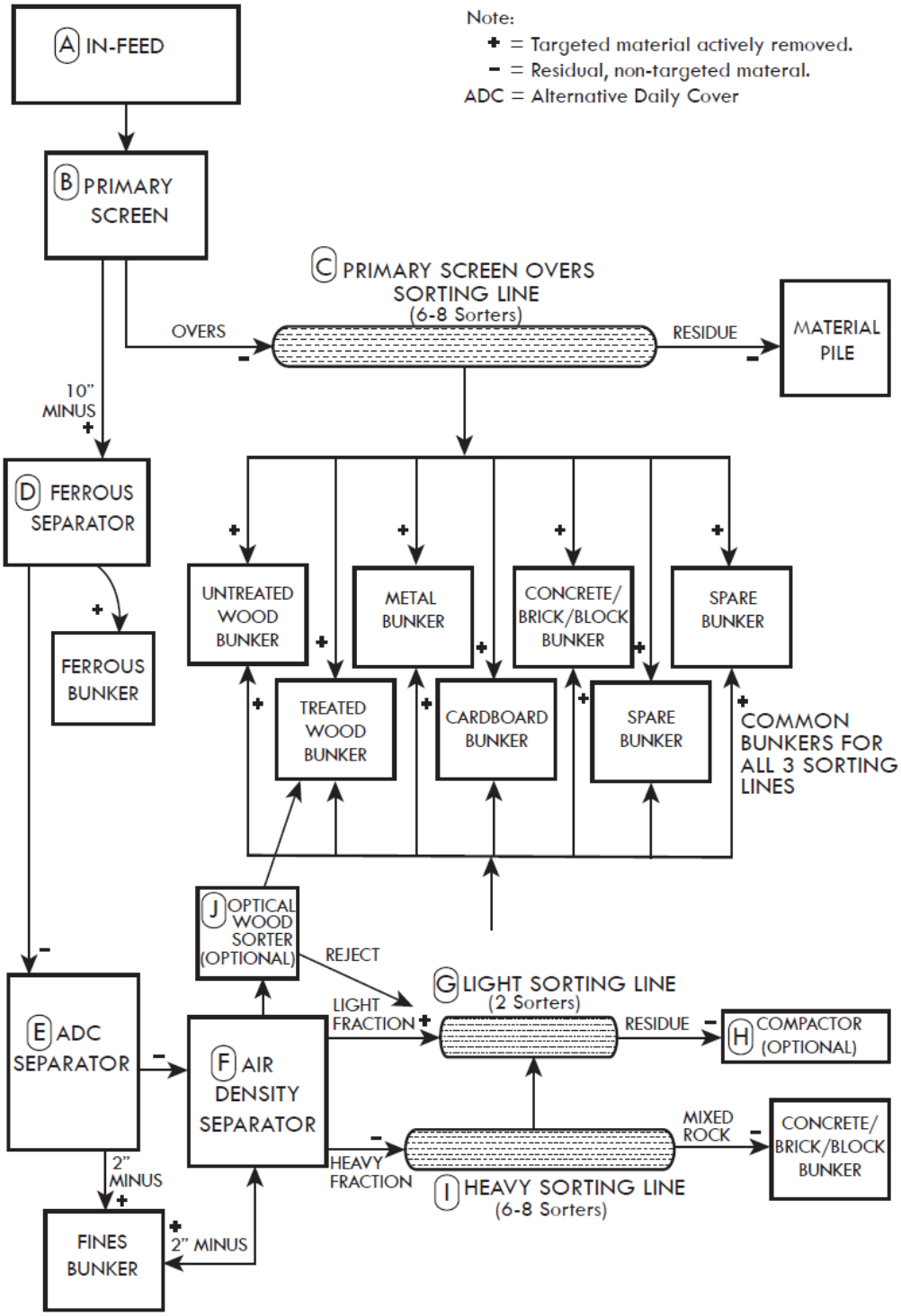


**Figure 2. C&DD Waste Processing Schematic**

Source: SCS Engineers

# SORTING AND PROCESSING EQUIPMENT

## Bulk Material Recycling

The recycling of large pieces of concrete, steel-reinforced concrete, and asphalt is a process that requires specially designed heavy duty machines. Concrete and asphalt recycling is either done at a permanent site or a mobile processing system can travel to the specific site if there is an extensive volume of material and bulky and heavy pieces that would be cost prohibitive to transport to the recycler. These machines can remove and recycle the steel reinforcing bars and crush the remaining concrete and aggregate to specific sizes. A bulk operation may be separate from an operation receiving a mixed waste stream with smaller pieces because of the land area required for the storage piles at the former operations.

A somewhat unique activity that is common in south Florida is the filling of rock-pit lakes with certain C&DD material considered to be "clean debris". Clean debris is clean concrete, brick, soil and rocks. Rock-pit lakes are very common in the region and are excavated to obtain the limestone which is a popular and inexpensive source for concrete aggregate and for use in road subgrade. Later when the quarry operation moves away, some of the lakes are back-filled with clean debris to make buildable ground.

This section will focus more on the mixed waste operations.

## Mixed Waste Recycling

### Screening Operations

#### Finger Screen

C&DD waste is often a clump of different size and types of materials intertwined together. These clumps must be separated at the front end of the process in order to make the separation and removal of the specific material as efficient as possible in downstream operations and to reduce the potential for downstream machinery to become clogged.

A popular and effective device known as a *finger screen* is often used for this purpose. A finger screen is a heavily-built mechanized conveyor that utilizes an articulated, oscillating floor to break up the waste clumps. The waste material is fed into one end and the combination of oscillating motion and the downward slope of the conveyor induces the waste to move forward and at the same time start to separate (Exhibit 3).

**Figure 3. Vibrating Finger Screen**

Source: Keith Howard

At the downstream end of the screen another feature can provide a rough separation of waste by size and density. If this division is desired, the conveyor floor has an opening in which smaller and denser materials (i.e., stones, wood and metal pieces, etc.) fall through the opening and are dropped onto another conveyor that takes them to another sorting process. Lighter, flatter and/or bulkier materials (i.e., cardboard, paper, plywood, plastic film, etc.) are carried off the end of the screen conveyor and into the next piece of sorting equipment.

## Trommel Screen

A *trommel screen* can be used to accept the material from a finger screen. If no size and density separation occurred on the finger screen, then the trommel can be used for this purpose. A trommel is a device that contains a hollow perforated tube, through which the waste moves. The trommel tube is perforated along its length and its circumference with holes or perforations of a specific diameter. The tube is angled similarly to the finger screen and is slowly turned on rollers by a motor. As the waste moves through the tube the rotating action and downward slope moves the materials forward where they encounter the perforations. Pieces of waste smaller than the perforations (known as "unders") will fall through the holes and onto a conveyor that will take that material to another sorting process. The larger pieces of material (known as the "overs") will move through the trommel and onto the next sorting process.

## Star Gear Screen

Another mechanized device used to separate waste into two size fractions is a *star gear screen*. A star gear is a conveyor that contains multiple rows of gears affixed to rotating axles. Each axle contains multiple gears which are spaced at precise intervals along the axle. The spacing of the gears is designed

to affect the separation of material. As waste material moves into the upstream end of the screen, it is propelled forward by the rotating gear assemblies. As the material moves over the gears, pieces that are dense and smaller than the opening between the gears falls though opening. This may include stones, pieces of wood, metal, plastic, brick, and similar material. Those pieces (the "unders") are collected by another conveyor and taken for further sorting or disposal. Pieces that are lighter and larger than the opening (the "overs") continue to move along the conveyor, essentially floating over the gears to the downstream end where they flow into the next process. Overs may include cardboard, other papers, pieces of lumber, drywall, plastic film, and similar materials.

## Ferrous Metal Separation and Removal

If large amounts of heavy ferrous metal objects are anticipated in the waste stream, then a device known as an *overhead magnet* is used to remove them from the other wastes. The device is essentially a large industrial magnet surrounded by a continuous looped conveyor belt. The entire device is suspended on a structural frame positioned perpendicular (at a 90 degree angle) above a conventional conveyor belt. Ferrous objects on the conventional conveyor passing under the energized magnet are pulled from the belt onto the magnet's moving belt and are swept away from the lower conveyor. As the looped belt passes out of the magnetized zone, the object is released and falls into a container for removal.

Other configurations of magnets are available for removal of smaller and lighter types of ferrous waste such as metal cans. These magnets, known as *pulley head magnets*, can be located within the end rotating pulley system of a conventional conveyor belt system. These magnets operate on a similar principle to the overhead magnet. Cans on the conveyor belt passing over the magnet are retained on the belt as it travels around the pulley to a point almost directly under the belt where the magnetic field ends. At that point the can falls off the belt and into a container. Non-ferrous material will flow off the end of the belt and with the help of the belts momentum, will take a trajectory away from the conveyor into a separate container.

## Heavy and Light Material Separation

### De-Stoner / Air Knife

Separation of light, “2-dimensional” materials such as paper, textile plastic film, aluminum and pieces of cardboard, from heavier, bulkier materials can be accomplished in an automated device called a *de-stoner / air knife*. Exhibit 4 shows a schematic cross section through a unit with two air knifes. This unit uses directional air currents and a vibratory motion to stratify and separate lighter material from heavier material. The unit is mounted on heavy coil springs to reduce the transmission of vibration to the ground.

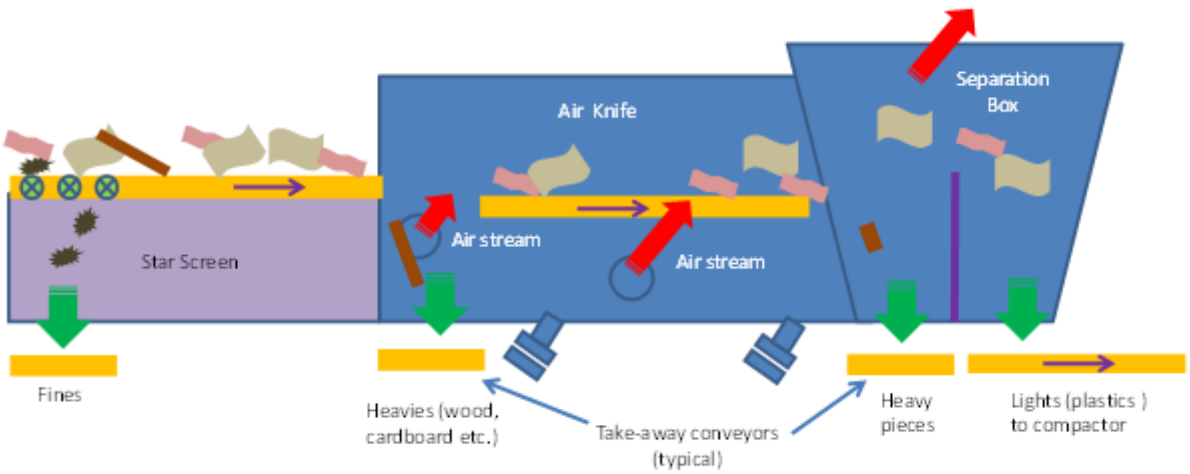


**Figure 4. Cross-Section of De-Stoner/Airknife**

Source: Bruce Clark

Following along on this exhibit the waste is fed in from a star gear screen and immediately encounters a gap in the air knife through which high velocity but low pressure air is flowing. The air flow is provided by a standard centrifugal blower. This flow of air blows the lighter and 2-dimensional materials up and towards the downstream conveyor. The heavier and bulkier materials, including small stones and pieces of glass and metal, are unaffected by the air current, and fall through the gap onto a take-away conveyor. Thus, the designation as a "de-stoner".

As the lighter materials are conveyed to the end of the air knife there is another high velocity, low pressure air stream directed through the conveyor. This final current of air separates the very light material (mostly plastics and light paper) from other denser bulkier material. The lighter material with a relatively large cross sectional area is carried to the far end of the collection bin, while the denser, more compact material does not travel as far and drops into the bin directly at the end of the conveyor. All air is exhausted out the top of the air box. If a hood is not used over the final air discharge to capture the light product, then a grate or similar screen is used to deflect light material into the air box end bin.

Exhaust air can be captured and rerouted back to the blowers to increase efficiency and reduce discharge of dust to the environment to near. This feature is recommended when the unit is used inside a building and outside where migrating dust could pose a nuisance to other operations or adjacent businesses.

## Optical Sorter

The use of automated machinery employing “electronic eyes” to assist in separating materials has become increasingly popular. In many cases the increased efficiency and higher purity targeted material provides a positive benefit/cost ratio as compared to traditional manual methods. The function of the equipment is based on the principle that all solid materials have a unique surface “signature,” that reflects and absorbs light rays in varying amounts.

Exhibit 5 shows a general cross section of an *optical sorter* than can be used to separate out large wood pieces.

Following along on this exhibit, as the waste material enters from the conveyor and passes under the control unit, a bright light illuminates the materials. A sophisticated instrument called a spectrometer imbedded in these machines “reads” the reflected light from the materials and through a computerized interface tuned to see wood product, actuates a compressed air device which sends a blast of air that is channeled by the computer program to specific multiple ports positioned across the end of the conveyor belt. As the materials pass over the ports, the ports that have been activated will discharge a blast of air under the material. The air ejects larger wood pieces to a receiving hopper on the far end of the machine, while non-wood material simply rolls off the end of the conveyor belt into a separate hopper.

A vibrating pan feed conveyor is often used to feed the optical sorter. This type of conveyor will increase the effectiveness of the optical sorter by flattening out and separating the materials before they enter the electronic eye detection zone of the sorter.

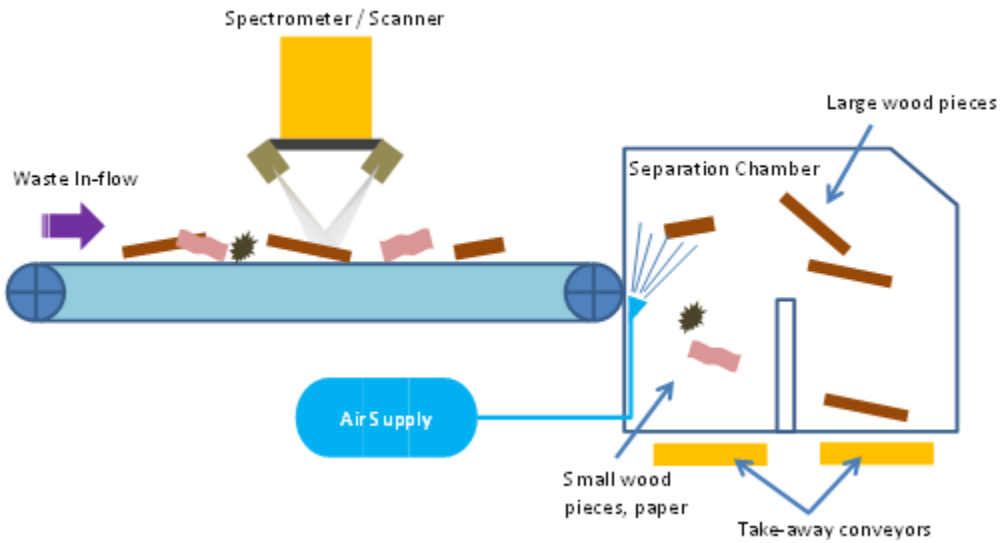


**Figure 5. Cross-Section of Optical Sorter**

Source: Bruce Clark

## Picking (Sorting) Line

Some separation of materials is still best achieved with manual labor. The *"picking line"* or *sorting line* is a mostly manual work station that is very common in C&DD recycling facilities. Picking lines are used for removal of many potentially valuable recyclable materials including but not limited to; flat pieces of wood, non-ferrous metals, asphalt and concrete pieces, and cardboard. A picking line is typically a long and narrow steel work platform elevated at least 10 feet or more above the normal working floor (Exhibit 6). Under the platform steel or concrete walls form side-by-side bunkers and re used to provide additional platform support. Each bunker is dedicated to temporary storage of a specific material.

**Figure 6. Semi-Automated Picking-Sorting Line**

Source: Keith Howard

One or more conveyors are mounted on the platform, parallel to its length, and workers stand along the length of the conveyor, usually on both sides. The conveyor is set at a fixed height so that workers have a comfortable arm reach to remove material from the moving belt. Conveyor belt widths can vary from 30 inches to approximately 72 inches in width, the maximum practical that allows a comfortable reach from either side. Workers are typically spaced about 6 to 8 feet apart. Located between each worker is a steel chute whose bottom is open through the platform floor.

Each worker is assigned to remove (i.e., pick) a specific material. As the conveyor moves material by each worker they pick their targeted material off the belt and drop the material through the chute where the material falls into a storage bunker. This is termed a “positive sort”. Any materials that are not picked from the conveyor are assumed to be of no recycling value or not practical to segregate and are allowed to flow off the end of the belt into an end bunker. This is termed the "negative sort" material, or alternately where the contaminant material is selected to be removed from the targeted material.

Periodically the bunkers will be unloaded and the materials taken away for final recycling/reuse or disposal. Bunkers can have mechanized unloading systems or be unloaded with a front-end loader.

## DUST CONTROL

### Introduction

The processing of C&DD waste typically generates a significant amount of dust. Most of the materials in C&DD are inherently dry and when they are agitated in the various processing operations, dust, actually

the minute pieces of some of the materials are liberated into the air. Dust particles from a C&DD operation can range in size from around 100 microns (concrete dust) up to 1,000 microns (textile dust).

C&DD processing operations outdoors *and* inside a building can create a nuisance to neighbors with fugitive dust generation if it is not controlled properly. Constant uncontrolled dust can also be a health hazard to workers.

The major sources of dust can include the following areas and pieces of equipment:

- Tipping Floor
- Finger Screen
- Air Knife
- Storage Piles (especially for residual "fine" materials)
- Recycled Material Load-Out

Dust control is mostly science and but also part art, and too extensive a topic to cover completely here. However, fugitive dust is probably the most prevalent problem with C&DD processing. Dust controls can take many forms, to basic static screening material, to misting devices, and/or to mechanized filtering systems. The most common system for waste operations, the misting system is discussed herein.

### Wet Systems

Dust is commonly controlled using wet spray systems where enclosing the material area is impractical. Wet systems can be applied for *prevention* of dust and *suppression* of dust. Prevention is applying a wet mist directly to the material to reduce liberation of dust. Suppression is applying a mist to the air around the material once it is agitated and dust is released. The type of misting system depends on the situation. Many C&DD recycling operations may require both. Recycling facilities are particularly sensitive to the correct dust control. If too much water is applied the materials may stick together and significantly reduce the effectiveness of downstream separation activities.

Effective dust control depends on many factors including; dust particle size, wind affects, freezing temperatures nozzle type, nozzle spray pattern, spray locations, available water pressure, use of compressed air, and use of surface wetting agents (surfactants) to name a few. The droplet size produced from the system must be compatible with the dust particle size or removal is reduced. Dust control is best left to companies that are expert in design and operation of these systems in waste handling operations.

## VIBRATION

A brief discussion on vibration is in order. The type of waste processing system described herein contain several pieces of heavy oscillating equipment, as well as a significant amount of rotating machinery, in general. These systems produce steady-state (continuous) vibration, and impact (isolated) vibration. Steady state vibration occurs during normal running operation. Impact vibration can occur

when the equipment is started and stopped or a unusually heavy material is dropped into the machinery. The location of such a system should consider the potential for this equipment to transmit these vibrations to the ground, despite the vibration dampening systems designed into most of the equipment. Vibration also results from waste tipping operations and load-out of recyclable materials. A significant buffer zone is generally needed between the equipment and the property line to allow the ground vibration to dissipate to a background level.

Many municipalities have a standard for industrial zones that sets the maximum limit on steady-state and impact vibration. Without an adequate buffer width, vibration can be transmitted to adjacent properties where it can become a significant annoyance. The distance and strength over which vibration can be transmitted is contingent on many factors including soil type, moisture content, frequency of vibration (i.e., number of oscillations per unit time) and others. It is recommended you consult the equipment manufacturer for guidance on a buffer distance. A buffer distance of 200 feet would be considered a good starting minimum with competent soil, a larger distance is preferred if available.

## RECYCLING BY-PRODUCTS

The processing of C&DD waste with a certain combination of equipment can result in a residual by-product known as recovered screen material (RSM). RSM looks similar to soil and is mostly the combined residual of some actual soil and minute pieces of friable waste that may include, drywall, paint, plaster, asphalt shingle grit, pieces of grout, cement and brick, glass, and plastic.

Some recycling companies have experimented with developing this product for use as a substitute where non-heavy load bearing natural soil fill is acceptable. For example, in shaping contours on a golf course, filling residential lots up to flood criteria, and similar uses where natural soil is typically used. Although some regulatory agencies have approved its use in certain conditions after an extensive chemical testing program, and it has been marketed with some limited success, extra caution is warranted. Some RSM has found to be contaminated with chemicals that although they are native to the virgin materials, are of environmental concern because of their potential to leach out of the RSM. These chemicals include polynuclear aromatic hydrocarbons (PAHs), lead, and arsenic.

RSM is ground-up residual from many materials. As a result, the surface area of the individual particles are increased which can increase their solubility when wetted. The increased solubility may result in leaching of the chemical which can result in contamination of the natural soil and groundwater. Common materials containing these contaminants include asphalt roofing shingles (PAHs), paint (lead) and treated wood (arsenic). Removal of the offending material from the waste stream before they go through the separation process so they do not end up in the RSM, is a time-consuming and expensive process that requires constant vigil by the operator. It is recommended to steer clear of RSM.

## PROCESSING SYSTEM MANUFACTURERS

C&DD processing systems have evolved to the point where complete, pre-engineered, custom-tailored systems can be ordered from a single source vendor. These vendors can assemble practically any combination of equipment into a complete system to process the targeted waste stream. This approach can provide the owner a single-source of responsibility should there be a problem with any part of the

system during design, start-up and full-scale operations. Systems are available for a few hundred cubic yards per day to more than 1,000 cubic yards per day.

For design consultants, this has been beneficial as the capabilities and performance of not only specific pieces of equipment, but an entire *system* can be discussed and a more efficient design produced as a result.

Costs for complete systems are difficult to state with certainty, there are many combinations of equipment possible and different variations of specific pieces of equipment. Budget capital costs of a complete installed mechanized system, similar to what has been described in this chapter, could be in the range of $6,000 to $9,000 per ton of capacity. This unit cost would not include site work, a building enclosure, lighting, electrical connections, structural modifications, etc

# APPENDIX E

# CASE STUDIES

# Shut-Down Processor Retrofit into Multi-Material MRF
## Lantana, FL

**Client**

Southern Waste Systems
Phil Medico
Director of Environmental Affairs
3251 SW 26th Terrace
Dania Beach, FL 33312-4927
(561) 582-6688

**Contract Amount**

$65,000

**Dates**

2008 - 2009

**Key Personnel**

Bruce Clark, PE

**Highlights**

- √ Waste Facility Planning
- √ Design of Waste Processing System
- √ Building Retrofit
- √ Site Engineering
- √ Design of Building Processing Ventilation
- √ Permitting
- √ Construction Oversight
- √ Final Certification

SCS Engineers (SCS) assisted Southern Waste Systems, FL in transforming a waste hauler facility that had been shut down by the FDEP into a mixed waste Material Recovery Facility (MRF).

Features:

The old facility occupied a 2-sided steel building. The new MRF was designed to use the building, being designed to fit efficiently within the space with a minimum of re-building. The total cost of the transformation into a 5,000 cubic yard per day (1,000 tons per day) MRF was approximately $2 million and included:

Installation of a mechanized material sorting and separation system, with the following elements:

- Vibrating finger screens for small material removal.
- Trommel for basic size separation
- Duel, elevated sorting platform with 12 picking positions
- Overhead magnet for ferrous separation
- High capacity ventilation fans system

The building was retrofitted for a leachate collection and disposal system. All existing building elements were retained; wall panels were added on two sides with sound-absorbing insulation to reduce noise transfer to outside.

Accomplishments:

SCS completed the following

- Developed the design to integrate the waste tipping and processing system into the existing building
- Designed the site civil engineering features and was able to provide the existing drainage system, saving the client $200,000
- Prepared the construction plans and specifications
- Prepared an Operational Plan to satisfy FDEP concerns about reducing odor, noise and traffic nuisances.
- Oversaw all of the construction, systems testing, and start-up.

The facility has been operational since 2008.

# Old Buildings Retrofitted into C&D MRF
## Tampa, Florida

**Client**

Waste Management, Inc.
Paul Bermillo
(former) Environmental Protection Manager
(318)-791-8028

**Contract Amount**

$107,000 (fee)

**Dates**

2011-12

**Key Personnel**

Bruce Clark, PE
Ed Hilton, P.E.

**Highlights**

- √ Facilities Planning
- √ Design of Materials Processing Systems
- √ Retrofit of old Building
- √ Design of Leachate Collection, Duct Controls, Lighting
- √ Permitting
- √ Construction Oversight
- √ Start-Up Assistance
- √ Final Certification

SCS Engineers (SCS) assisted Waste Management Inc. in transforming a paper trans-haul facility into a fully automated Class III (trash and C&D) - Mixed Waste Material Recovery Facility (MRF).

**Features:**

The paper hauling occupied two 50-year old buildings. The MRF was designed to use the two buildings, being designed to fit efficiently within the space with a minimum of re-building. The total cost of the transformation into a 900 ton per day MRF was approximately $8 million and included:

A highly automated material sorting and separation system, with the following elements:

- Vibrating Finger screens for initial size separation
- Overhead magnet for ferrous removal
- De-Stoner – dual air knife design for separation of heavy, light and ultra-light materials
- Optical sorting system for wood separation
- Elevated sorting platform with 14 picking positions and two reversing conveyors for optimum material recovery
- Retrofitted a new leachate collection and disposal system

The only building element replaced was part of the floor slab in the processing building.

**Accomplishments:**

SCS developed the design to integrate the waste processing system into the buildings, did the site civil engineering, provided design of upgrades to the building's interior lighting and ventilation / dust controls, and oversaw all of the construction, systems testing and start-up.

SCS obtained FDEP (state) approval, prior to permit issuance, to use the tipping building to continue with trans-shipments until the conversion was completed, saving the client more than $300,000.

SCS obtained all environmental and building permits for the facility including:

- FDEP (state) Solid Waste Processing Facility
- City of Tampa Sewers
- Hillsborough County Sewers
- City of Tampa Building Dept.

The facility is the first of its kind in Florida and has been operational since the Fall of 2012.

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## The Basics

- Owner = Waste Management Inc. of Florida
- Mixed waste MRF (Florida Class III – trash and C&D)
- Design Capacity = 900 tons per day
- Total footprint (tipping and processing) ≈ 37,000 s.f.
- Sorting System Vendor = Sherbrooke OEM, Canada
- Overall Construction cost ≈ $8 million (sorting system about $4 million)

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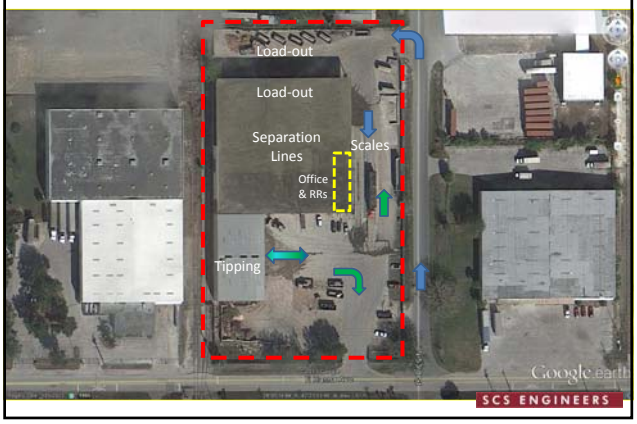
## Site Layout

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## Main Processing Features

- Totally automated operation
- Separation for 8 different materials
- Ferrous magnet
- Optical sorter for wood
- De-stoner/Air knife – Expansion box for light papers / plastics
- Stargear screen for fines separation
- Elevated manual picking line
- Reversing conveyors on pick line
- Total of 19 conveyors (some reversible)

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## SCS' Responsibilities

- Obtain Solid Waste Construction-Operation Permit
- Other Environmental Permits (Sewer)
- Documentation for Building Permit
- Upgrades to Lighting and Ventilation
- New Leachate Collection & Force Main
- Final Inspection and Start-Up test

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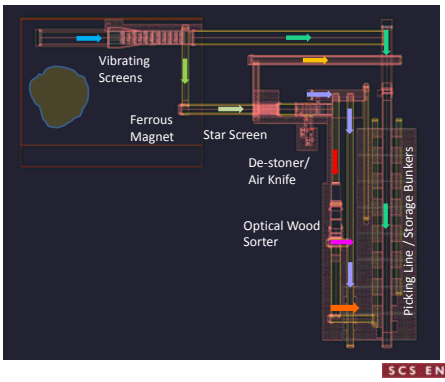
## Processing System Layout

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## Tipping Area

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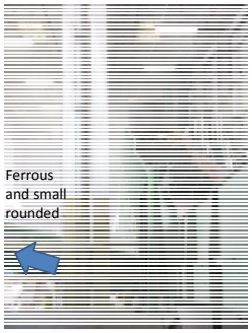
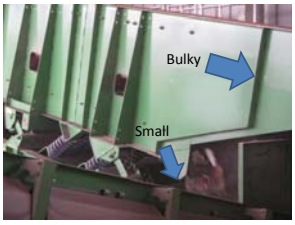
## Small / Bulky Separation

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## Small Piece Separation
(Star Screen)

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## De-Stoner / Fines & Light Separation

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## Fines Separation

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## Fines Separation

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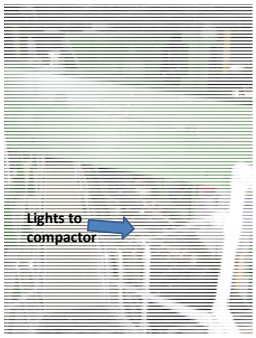
## Additional Separations

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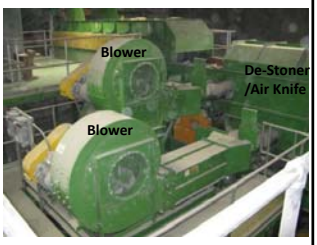
## Automated Sorting Equipment

Ballistic Sorter (large & small wood)




De-Stoner Air Knife
(heavy / light fractions)

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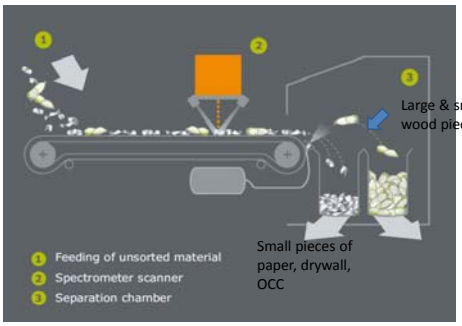
## Optical Sensing/Sorting Technology




Source: TITECH

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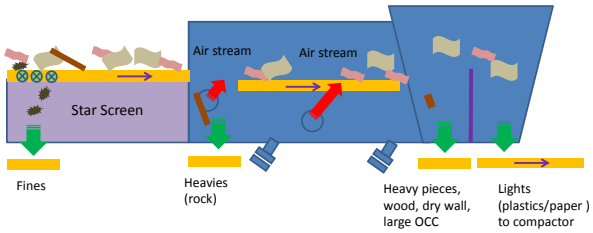
## De-Stoner / Air Knife Separation Technology

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## Wood Capture

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## High Capacity Picking Line

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## Load Out Space (inside and outside)

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## Challenges

- Dust – waste is naturally dry and a few locations in the process agitate the material and release dust;
  - Tipping floor
  - Vibratory in-feed conveyor
  - Air knife and expansion box
- Fitting the system in - Existing building w/relatively low ceiling
- Retrofit for leachate collection

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## Dust Challenge

- Decision to contain dust within the buildings and knock-down with misters.
  - Adjacent active businesses
- Use of multiple fans to force dust to unoccupied side of processing building
  - Star screen
  - Air knife & expansion box
  - Wood sorter
  - Picking line

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## Modifications After Start-Up
(Dust Controls)

Problem

"Tunnel" effect on windy days resulting in dust migrating off-site

Solution

- Inside building = Install higher flow misters
- Install dust containment netting and misters;
  - At high dust producing equipment
  - Exterior at tipping & load-out areas
- Automated dust filter system deemed not cost effective at this time.

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## High Flow Misters

SCS ENGINEERS

## High Flow Misters

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## Dust Block Netting / Fans

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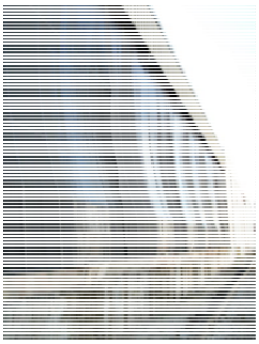
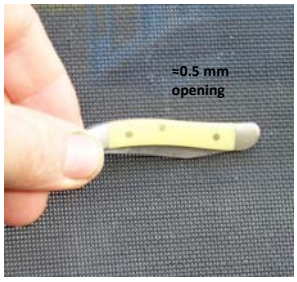
## Dust Block Netting



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## Netting to Stop Off-Site Migration

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## Modifications After Start-Up
(Processing Equipment)

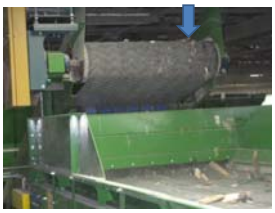
- Feed conveyor to wood sorter:

  Problem

  Waste was favoring one side of the feed conveyor and resulting in low extraction

  Solution

  – Slide tray and diverter bar on conveyor end



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## Modifications

Original selection - w/vibratory feed table (not installed)

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## Modifications After Start-Up
(Processing Equipment)

- Optical wood sorter:

  Problem

  Electronic eye being "fooled" by white dust on belt resulting in non-wood waste being extracted (the eye thinks it sees large continuous pieces and the air ejectors run continuously).

  Solution

  – Mist the feed conveyor belt (wash off the white dust) to expose black belt

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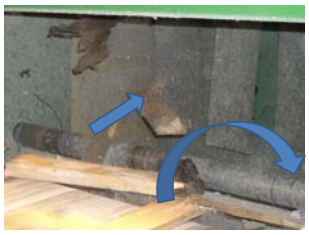
## Optical Sorting Action

Occasional stray bag fools eyes – will be picked downstream (optional)



Large wood selectively ejected

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The End
Thank You for You Time
SCS ENGINEERS

SCS ENGINEERS

# City of Virginia Beach Compressed Natural Gas Vehicle Conversion Feasibility Study

**Robert B. Gardner, PE, BCEE**
**Senior Vice President**

**April 11, 2013**

# Presentation Outline

- Scope of study
- City Background
- Background NGV's
- Analysis
- Conclusions

# Scope of Study

- Federal Stimulus grant
- Focus: solid waste collection fleet
- Identify steps to implement
- Identify advantages and disadvantages
- Life cycle cost analysis

# Background Information

- City residential customers: 123,600
- Collection Services:
  - Residential: 1 x week
  - Yard Waste: 1 x week
  - Bulky Items: As requested
  - Recycling (contracted): every other week
- 6.4 million collections/year
- $14.5 Million/year

# Residential Collection Fleet

| Type | Number | Average Age |
|---|---|---|
| BULKY REFUSE W BOOM 28-29YD | 13 | 10.2 |
| REFUSE COMP ART ARM 18-19YD | 14 | 9.8 |
| REFUSE COMP REAR LOAD 18-19Y | 17 | 10.3 |
| REFUSE COMP REAR LOAD 20-21Y | 1 | 11.0 |
| REFUSE COMP REAR LOAD 24-25Y | 9 | 2.1 |
| REFUSE COMP SIDE LOAD 20-CY | 17 | 7.2 |
| REFUSE COMP SIDE LOAD 28-29Y | 22 | 2.9 |
| **Totals** | **93** | **7.1** |

# Fleet Parking Area

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# Solid Waste Fleet Parking

Refuse Comp Rear Load 18-19 CY

Refuse Comp Rear Load 20-21CY

Refuse Comp Art Arm 18-19 CY

Refuse Comp Side Load 20 CY



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Refuse Comp Rear Load 24-25CY

Bulky Waste w/ Boom 28-29CY

CNG FUELING PROCEDURE
WARNING
STOP MOTOR
NO SMOKING
FLAMMABLE GAS
CNG
VEHICLE PARKING ONLY

3000 PSI
2
42922 9099
EW.17,2
GW.40,0
FUEL 50

# Diesel Fueling Stations

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# Vehicle Statistics

- Avg. Route Miles/truck: 127 mi/day
- Fuel Use (Diesel)
  - 70 gal/1.25 days
  - 2,600-7,500 gal/year/vehicle
  - 380,000 gal/year
- Average Maintenance: $15,000/year

# Types of Fill Stations

- Time Fill
  - Lower pressure
  - Lower maintenance costs
  - 8 to 10 hour fill time
  - Good for fleet vehicles

RICHMOND
VIRGINIA
104671

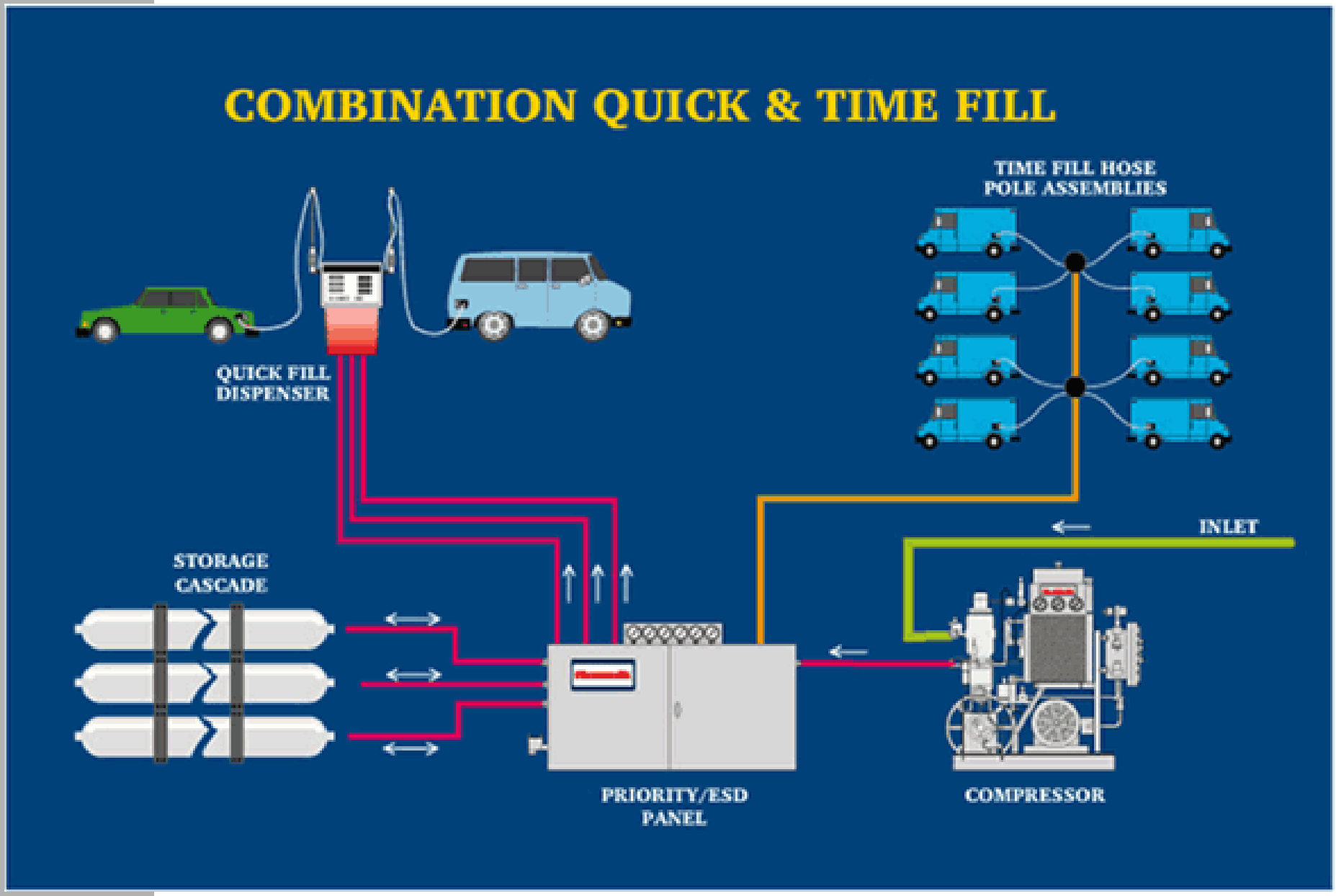
# Types of Fill Stations

- Quick Fill
  - Higher pressure
  - Higher operation & maintenance costs
  - Storage required
  - More flexibility

Natural Gas for
Clean Energy
Clean Energy

# Types of Fill Stations

- Combination



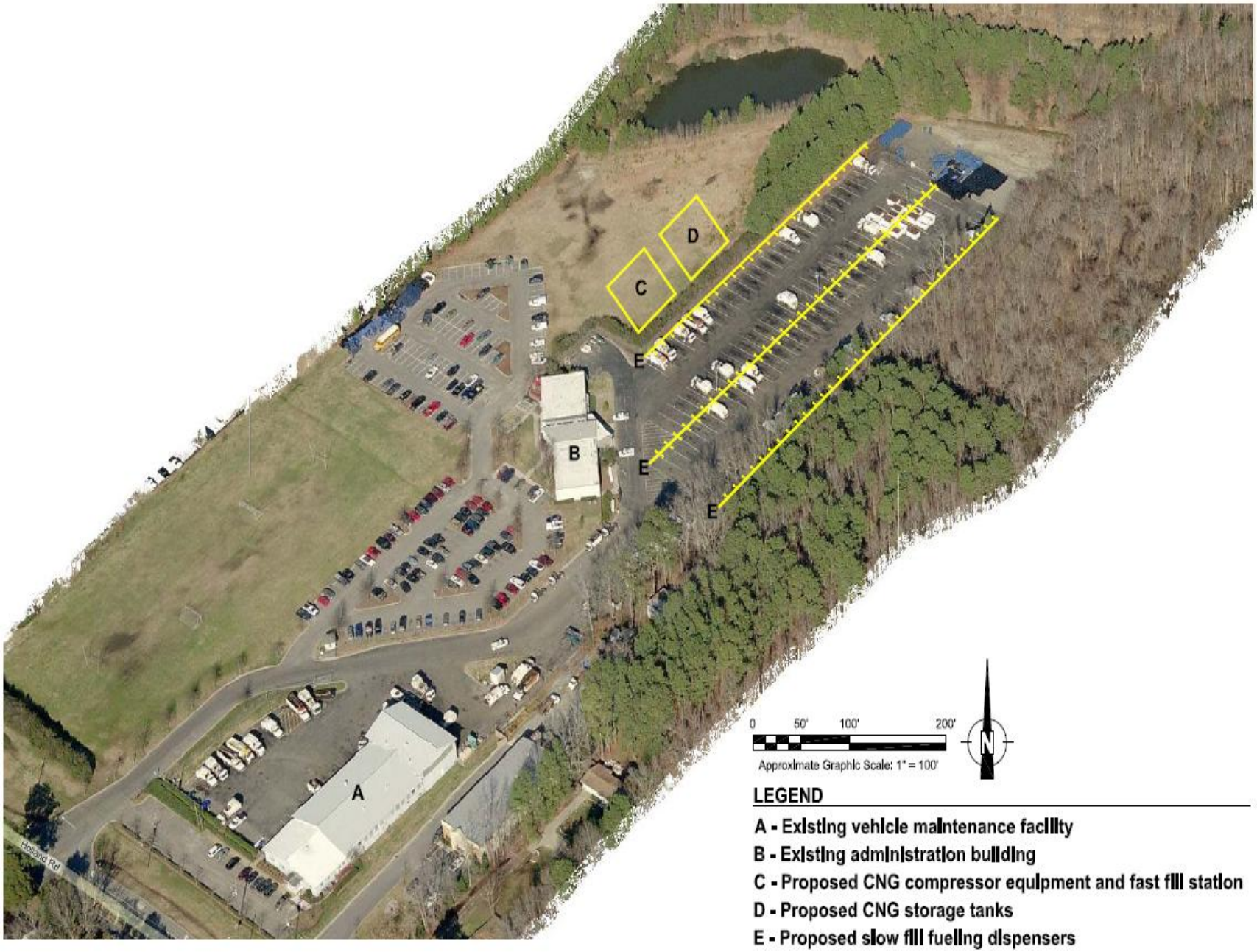

Source: Norwalk Compressors http://www.norwalkcompressor.com/html/ngv.html

# Key Evaluation Factors

- Make up of City's fleet
- Purchase price premium for CNG vehicles
- O&M requirements
- Required new facilities and existing facility modifications
- Engine efficiency, diesel vs CNG
- Fuel pricing: diesel vs CNG

# Key Variables in Analysis

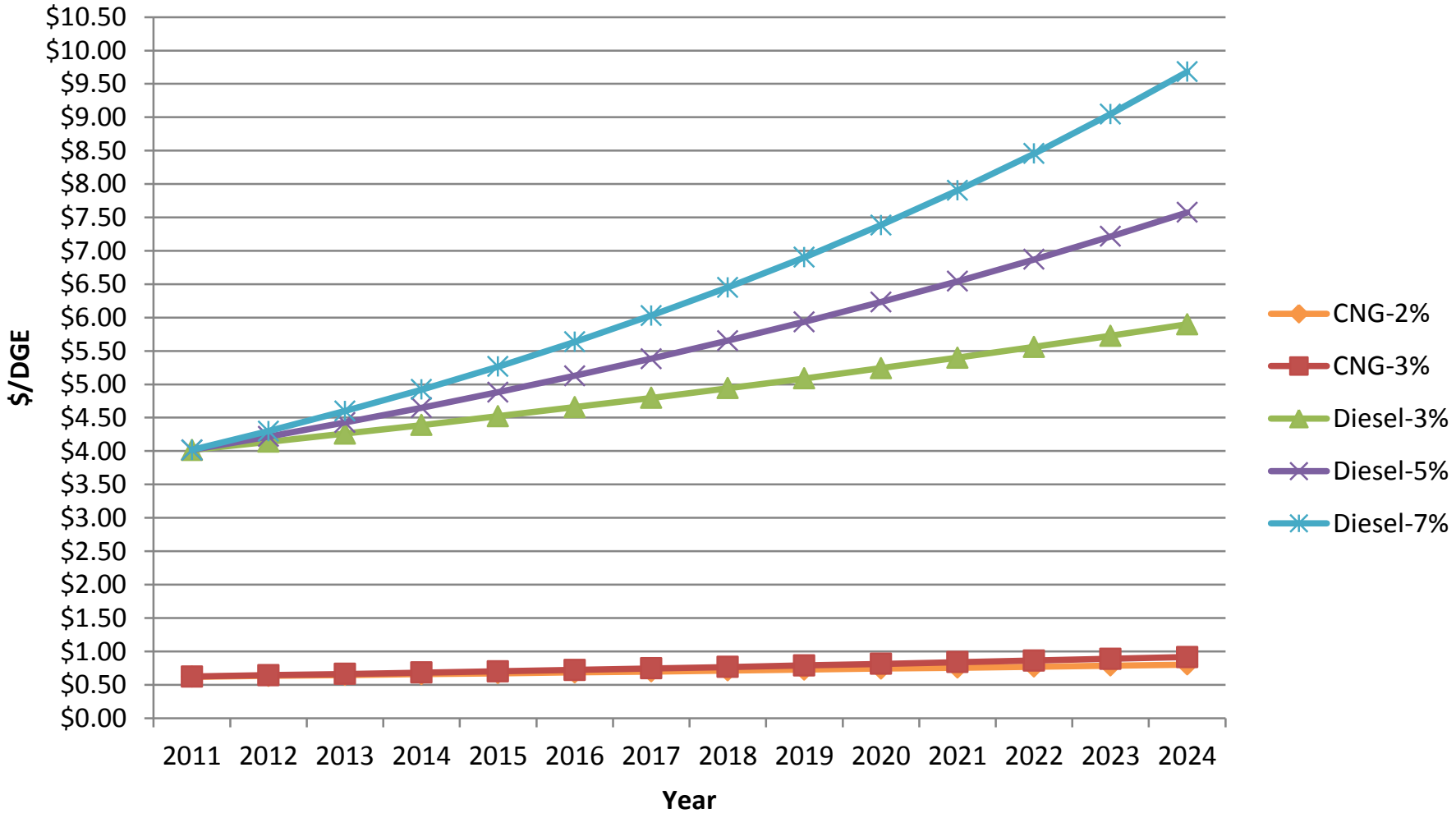
| Variable | Assumed Values |
|---|---|
| **Replacement cycle** | 7 years |
| **Purchase premium** | 15-20% |
| **Salvage value** | 10% |
| **CNG O&M factor** | 10-15% |
| **Fuel efficiency factor** | 9-13% |
| **Fuel pricing (CNG/D)** | 3%/3%, 3%/5%, 2%/7% |
| **Period of analysis** | 14 years |




**LEGEND**

A - Existing vehicle maintenance facility
B - Existing administration building
C - Proposed CNG compressor equipment and fast fill station
D - Proposed CNG storage tanks
E - Proposed slow fill fueling dispensers

# Diesel and CNG Price Projections



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# Life Cycle Cost Analysis

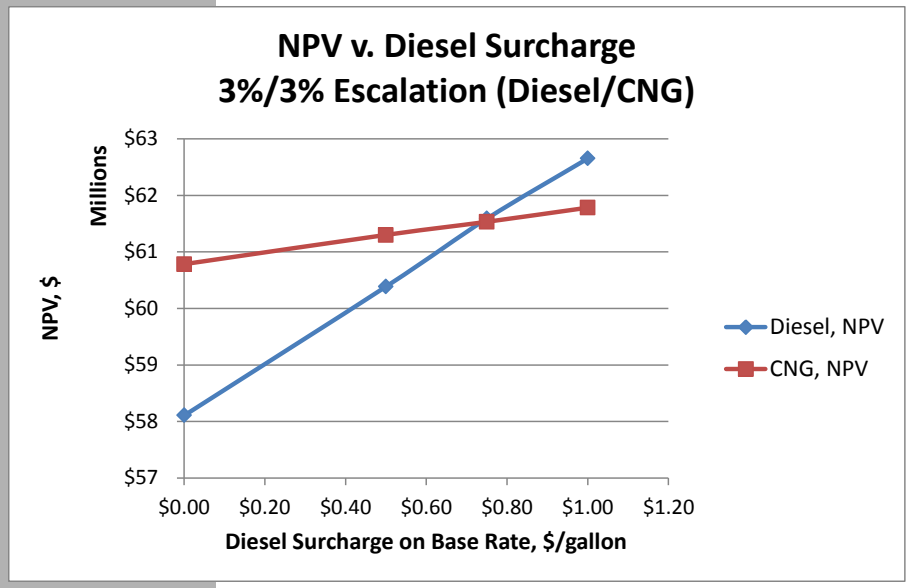
- Capital cost for fueling station
- Cost and sequencing of replacement vehicles
- O&M costs
  - Vehicles
  - Fueling station
- Fuel usage and costs
- Net present value analysis

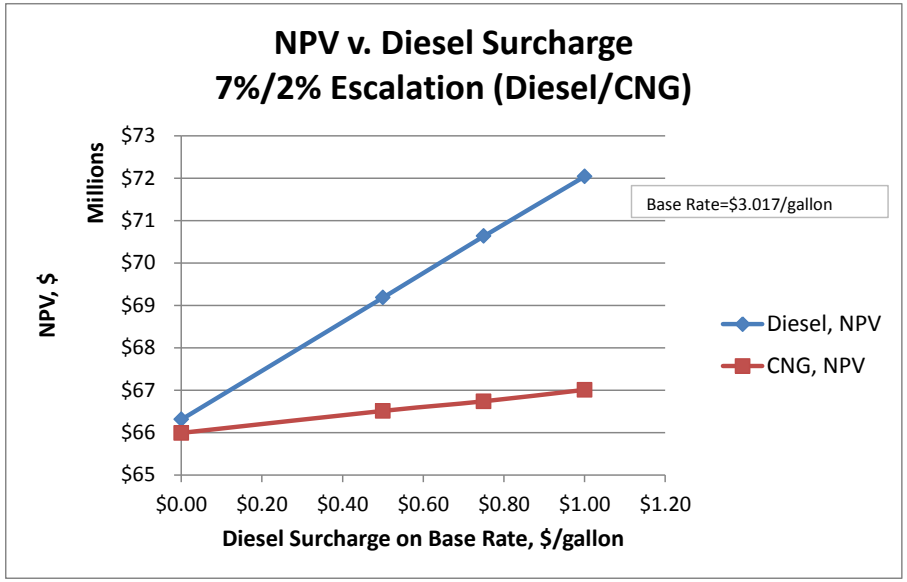
## "Base Case" Scenario
## Pro Forma Analysis for
## Time - Fill/Quick - Fill Combination Station ,
## 20% Vehicle Purchase Premium,
## 15% Vehicle Maintenance Factor,
## Variable Fuel Escalator

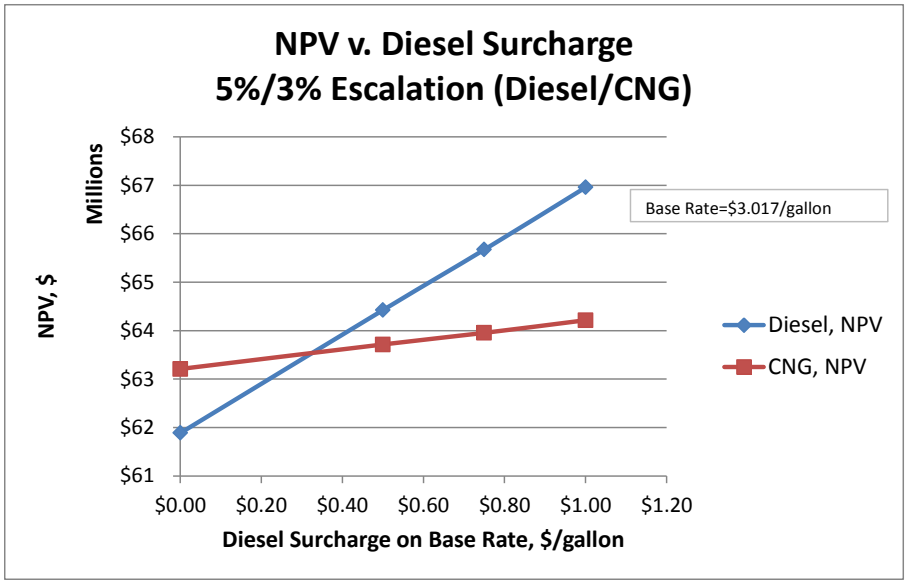
| Fuel and Fueling Station Configuration | Diesel Fuel Escalation Factor | CNG Fuel Escalation Factor | CNG Maintenance Factor | CNG Vehicle Purchase Premium Factor | CNG Fuel Eff. Penalty Factor | Starting Fuel Price ($/gal-DGE) | NPV ($) |
|---|---|---|---|---|---|---|---|
| **Time-Fill/Quick-Fill Combination** | | | | | | | |
| Diesel Status Quo | 3% | | | | | 3.017 | 58,105,000 |
| CNG-4 | 3% | 3% | 15% | 20% | 13.00% | | 60,783,000 |
| **Time-Fill/Quick-Fill Combination** | | | | | | | |
| Diesel Status Quo | 5% | | | | | 3.017 | 61,886,000 |
| CNG-4 | 5% | 3% | 15% | 20% | 13.00% | | 63,209,000 |
| **Time-Fill/Quick-Fill Combination** | | | | | | | |
| Diesel Status Quo | 7% | | | | | 3.017 | 66,307,000 |
| CNG-4 | 7% | 2% | 15% | 20% | 13.00% | | **$65,993,000** |

## "Best Case" Scenario
## Pro For ma Analysis for
## Time - Fill/Quick - Fill Combination Station ,
## 15 % Vehicle Purchase Premium,
## 10% Vehicle Maintenance Factor,
## 9% Fuel Efficiency Penalty
## Variable Fuel Escalators

| Fuel and Fueling Station Configuration | Diesel Fuel Escalation Factor | CNG Fuel Escalation Factor | CNG Maintenance Factor | CNG Vehicle Purchase Premium Factor | CNG Fuel Eff. Penalty Factor | Starting Fuel Price ($/gal-DGE) | NPV ($) |
|---|---|---|---|---|---|---|---|
| **Time-Fill/Quick-Fill Combination** | | | | | | | |
| Diesel Status Quo | **3%** | | | | | 3.017 | 58,105,000 |
| CNG-2 | 3% | 3% | 10% | 15% | 9.00% | 3.017 | 58,182,000 |
| **Time-Fill/Quick-Fill Combination** | | | | | | | |
| Diesel Status Quo | **5%** | | | | | 3.017 | 61,886,000 |
| CNG-2 | 5% | 3% | 10% | 15% | 9.00% | 3.017 | **60,505,000** |
| **Time-Fill/Quick-Fill Combination** | | | | | | | |
| Diesel Status Quo | **7%** | | | | | 3.017 | 66,307,000 |
| CNG-2 | 7% | 2% | 10% | 15% | 9.00% | 3.017 | **63,014,000** |


NPV v. Diesel Surcharge
3%/3% Escalation (Diesel/CNG)
NPV, $
Millions
$63
$62
$61
$60
$59
$58
$57
$0.00
$0.20
$0.40
$0.60
$0.80
$1.00
$1.20
Diesel Surcharge on Base Rate, $/gallon
Diesel, NPV
CNG, NPV


NPV v. Diesel Surcharge
7%/2% Escalation (Diesel/CNG)
NPV, $
Millions
$73
$72
$71
$70
$69
$68
$67
$66
$65
Base Rate=$3.017/gallon
$0.00
$0.20
$0.40
$0.60
$0.80
$1.00
$1.20
Diesel Surcharge on Base Rate, $/gallon
Diesel, NPV
CNG, NPV


NPV v. Diesel Surcharge
5%/3% Escalation (Diesel/CNG)
NPV, $
Millions
$68
$67
$66
$65
$64
$63
$62
$61
Base Rate=$3.017/gallon
$0.00
$0.20
$0.40
$0.60
$0.80
$1.00
$1.20
Diesel Surcharge on Base Rate, $/gallon
Diesel, NPV
CNG, NPV

# Conclusions

- Conversion is feasible
- Significant capital needed
  - Purchase vehicles: +$40K/vehicle
  - Construct fill station: $1.6M
  - Maintenance facility modifications: $600K

# Summary of Capital Costs

| Capital Item | Cost Range |
|---|---|
| Filling Station (time-fill/quick-fill combination) | $1.0 million - $1.65 million |
| Maintenance Facility Upgrades | $450,000 to $600,000 |
| Equipment purchase premium (20%) | $3.4 million |
| Total | $4.85 million to $5.65 million |



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# Conclusions

- Advantages
  - Lower fuel cost ($1.88/DGE commercial)
  - Cleaner burning fuel
  - Domestic source of fuel
  - Quieter

# Conclusions

- Disadvantages
  - Dual fuel operation
  - Different O&M procedures on vehicles
  - Capital costs for station and vehicles
  - Increased O&M
  - Reduced thermal efficiency of engines
  - Uncertain salvage value
  - Operational uncertainty
  - Heavier vehicles

# Conclusions

- Economic attractiveness of CNG dependent on projected fuel escalation factors.
- Decision factors
  - Does the City want to manage two types of vehicles?
  - Future fuel prices
  - Purchase price, O&M, and Energy efficiency

# APPENDIX F

# ORDINANCES

# CHAPTER 24 – COK SW ORDINANCE

# Chapter 24

## SOLID WASTE[??]

**Art. I. In General, §§ 24-1--24-25**
**Art. II. Municipal Collection and Disposal Service, §§ 24-26--24-125**
Div. 1. Generally, §§ 24-26--24-45
Div. 2. Residential Collection, §§ 24-46--24-60
Div. 3. Commercial Collection, §§ 24-61--24-80
Div. 4. Recycling Program, §§ 24-81--24-99
Div. 5. Transfer Station, §§ 24-100--24-114
Div. 6. Rate Schedule, §§ 24-115--24-125

## ARTICLE I. IN GENERAL

**Sec. 24-1. Penalty.**

Unless stated otherwise, violations of this chapter shall be punished as provided in section 1-8.

**Secs. 24-2--24-25. Reserved.**

## ARTICLE II. MUNICIPAL COLLECTION AND DISPOSAL SERVICE[????]

### DIVISION 1. GENERALLY

**Sec. 24-26. Definitions.**

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

*Approved receptacle* shall mean:

(a) A container of various sizes furnished by the city to residential and commercial customers to store solid waste for collection.
(b) A plastic bag having sufficient wall strength, a thickness of not less than 1.2 mils, to maintain physical integrity when lifted at the top, the opening closed by tie or other seal, and contents not weighing more than fifty (50) pounds.

---

[1]**Charter reference**–Powers relative to solid waste, § 12.

**Cross references**–Health and human services, Ch. 13; nuisances, Ch. 18; water, sewers and sewage disposal, Ch. 30.

**State law references**–Solid Waste Disposal Act, V.T.C.A., Health and Safety Code § 361.001 et seq.; Solid Waste Recovery Financing Act, V.T.C.A., Health and Safety Code § 362.001 et seq.; Comprehensive Municipal Solid Waste Management, Resource Recovery and Conservation Act, V.T.C.A., Health and Safety Code § 363.001 et seq.; Texas Litter Abatement Act, V.T.C.A., Health and Safety Code § 365.001 et seq.

[2]**State law references**–Local solid waste management plan, V.T.C.A., Health and Safety Code §363.004; municipal collection and disposal services, V.T.C.A., Health and Safety Code § 363.111 et seq.

*Automated collection* – the use of mechanical devices to lift and empty solid waste containers into solid waste collection vehicles.

*Automated container* – a container provided by the city of varying capacity used for garbage/rubbish collection.

*Boxes* – corrugated cardboard boxes with dimensions not exceeding 2 ft x 2 ft x 2 ft, and/or a volume of 8 cubic feet, capable of holding the materials therein, when lifted. Solid waste materials placed in the box shall be acceptable materials for collection, and shall be contained so as not to cause windblown litter.

*Brush* – cuttings or trimmings from trees or shrubs of such length and bulk that cannot be placed in a container.

*Bulky waste* shall mean large items, objects, or stable matter, which because of their bulk, size, weight, and/or dimensions, can not be placed in an approved receptacle or container, and require special collection methods. Examples include furniture items, appliances, tree limbs, and construction debris.

*Business*, as used herein, shall mean any commercial operation, or any usage of property for other than residential purposes, involving the employment of any individual, or the sale or manufacture of any product.

*Chlorinated fluorocarbon (CFC)* - a refrigerant used in freezers, refrigerators, and air conditioners.

*City* – the city of Killeen, Bell County, Texas.

*Collection* – the act of removing accumulated solid waste from the point of collection and transporting it to a solid waste management facility; collection may also occur at centralized points where generators deliver their solid waste.

*Collection day* - for residential collection is 7:00 a.m. to 6:00 p.m., Monday, Tuesday, Thursday, and Friday, as designated for a particular service area or geographical region.

*Collection frequency* – the number of times per week that collection service is provided.

*Collection/service stop* – a term used to describe a unique address that is a point of collection and requires collection services, i.e., a geographical point within a service area that requires the collection vehicle to stop and collect solid waste and/or recyclables, or other materials.

*Collection system* – a combination of the various components that are necessary to provide a collection service, including the system design, equipment and human resources, point of collection, frequency, system costs, and method of financing.

*Commercial customer* – any enterprise or establishment whose main purpose is to carry on a business activity whether for profit or not, and typically includes, but not limited to, such enterprises as: hotels, motels, restaurants, fast food establishments, retail stores, schools, offices, shopping centers/malls/plazas, factories/manufacturing facilities, warehouses, and high density occupied dwellings such as apartment complexes and mobile home parks.

*Compost* – compost is an organic soil conditioner that has been stabilized to a humuslike product that is free of viable human and plant pathogens and plant seeds, that does not attract insects or other vectors (organisms that transmit pathogens), that can be handled and stored without nuisance, and that is beneficial to the growth of plants.

*Construction debris* shall mean building material waste resulting from demolition, remodeling, repair, or construction.

*Curbline* – the area directly behind the curb. In the absence of a curb, the area directly behind the edge of the roadway.

*Curbside collection* – the collection of solid waste, recyclables, or other materials placed in front of the property (curbside) by the generator who then returns the container to its normal location after it has been emptied.

*Disabled household* shall mean a residential dwelling unit where all occupants over the age of sixteen (16) are physically incapable of transporting garbage and/or rubbish to the property curbside. A statement or certification from a licensed medical doctor may be required to substantiate the incapacity.

*Dumpster* – a common term used to describe storage bins (containers) for commercial, institutional, and industrial solid waste.

*Garbage* shall mean solid waste consisting of putrescible animal and vegetable waste materials resulting from the handling, preparation, cooking, and consumption of food, including waste materials from markets, storage facilities, handling and sale of produce and other food products.

*Hazardous waste material* shall mean any solid waste identified or listed as a hazardous waste by the administrator of the Environmental Protection Agency (EPA) pursuant to the Federal Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, section 42 USC, section 6901 et seq., as amended.

*Manual collection* – a method of collecting solid waste where the operator and/or collector(s) leave the collection vehicle and manually empties the container(s). Storage containers may be brought to the point of collection by the generator or a member of the collection crew.

*Materials recovery facility* – a term used for a facility that separates mixed (commingled) recyclables into various components and processes those components for sale as secondary materials.

*Noncollection material* - materials that shall not be collected by the solid waste services division, including, but not limited to, rock, dirt, manure, dead animals, tires, tire and wheel combinations, hazardous waste material, lead acid batteries, engines, lawn mowers, riding mowers, liquid waste of any kind, vehicle bodies, boats, mobile homes, trailers, campers, and other items of like size; waste from undeveloped property, and landscaping waste for new homes or commercial sites.

*Point of collection* – a geographical point on a generator's property where storage containers are placed for collection service.

*Premises* - businesses, houses, boarding and rooming houses, theaters, hotels, restaurants, cafes, eating houses, tourist camps, apartments, sanitariums, schools, private residences, vacant lots, and all other places within the city where garbage, trash or rubbish accumulates in ordinary quantities.

*Putrescible garbage*, as used herein, shall be held and construed to mean animal or vegetable matter, such as waste material from kitchens, grocery stores, butcher shops, restaurants, cafes, hotel, rooming and boarding houses, such as scraps of meat, bread, bones, and peelings of fruit and vegetables.

*Recycling* – the diversion of specific materials from a solid waste stream and the processing of those materials for use as new products and/or other productive uses including composting.

*Recycling drop-off center* – a location, either temporary or permanent, established for the receipt of recyclable solid waste including, but not limited to, aluminum, cardboard, metal, paper, glass, and plastic.

*Residential solid waste* – solid waste generated from single and multi-family sources; frequently called household solid waste, or household wastes.

*Roll-off container* – a container used for the storage, collection and transport of commercial, institutional, or industrial solid waste. The container is pulled onto the tilt-frame of the collection vehicle with a cable by winch, reeving cylinders, or by hooks and taken to a solid waste management facility for emptying. Normally, an empty roll-off container is delivered to a customer at the time of collection, rolled off, and left for future use.

*Route* – a round of stops to collect solid waste; a path regularly visited by a collection vehicle.

*Rubbish*, as used herein, shall mean nonputrescible solid waste, consisting of both combustible and noncombustible waste materials; including, but not limited to, paper, rags, cartons, excelsior, rubber, plastics, yard trimmings, leaves, glass, crockery, tin cans, aluminum cans, and other such waste generated from residential and commercial sources.

*Scavenging* – the uncontrolled and unauthorized removal of materials from any container,

bag, or receptacle within the corporate limits of the city.

*Scrap tire* – any tire that can no longer be used for its original intended purpose.

*Service area* – a geographic area provided solid waste collection service; service areas are normally divided into districts or routes to provide collection services.

*Special wastes* – a term commonly used to describe specific materials that may require special collection and management approaches.

*Transfer station* – a facility where the transfer of collected solid wastes from collection vehicles to transfer vehicles takes place.

*White goods* – used to denote large household appliances such as refrigerators, stoves, ranges, air conditioners, dryers, and washing machines.

*Yard waste*, as used herein, shall mean leaves, grass clippings, shrubs or plant cuttings, yard and garden debris, resulting from yard maintenance, that can be placed in a plastic bag for disposal.
(Ord. No. 03-41, § I, 8-26-03)
**Cross reference(s)**--Definitions and rules of construction generally, § 1-2.

**Sec. 24-27. Placement in receptacle.**

Each person within the city having garbage and rubbish to be disposed of is hereby required to place same in approved receptacles. It is unlawful for any person to place any garbage or rubbish on the ground, or in anything other than an approved receptacle. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-28. Customers required to maintain sufficient disposal capacity.**

Each owner, occupant, tenant, or lessee using or occupying any residence or structure or who has a place of business within the city is required to keep and maintain at all times at such residence or structure or place of business approved receptacles in sufficient numbers to properly contain all garbage and rubbish disposed of from such residence or structure or place of business. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-29. City to provide solid waste services.**

(a) The city's solid waste services division shall be the exclusive provider of residential and commercial garbage, rubbish, and solid waste collection and disposal services for all premises within the city. It shall be unlawful for any person or corporation to provide residential or commercial garbage, rubbish, or solid waste collection or disposal services to any person for compensation within the city, or to make use of the public streets for that purpose, without first obtaining an approved permit from the city council.

(b) All residential and commercial premises shall subscribe to the city solid waste services. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-30. Solid waste compliance.**

The city's solid waste services division shall not make collection of garbage, trash, recycling, rubbish, brush, large items, and white goods, where same are not prepared for collection and placed as designated by the terms of this article. Failure to comply will be an offense and each day's failure to comply will constitute a separate offense. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-31. Securing receptacles required.**

All plastic bags shall be securely closed at all times and other approved receptacles shall be equipped with adequate lids or coverings and shall be covered by such lids or coverings at all times. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-32. Noncollection material.**

Noncollection material shall be hauled away from the premises by the owner, occupant, tenant or lessee thereof at his own expense and by his own means. Such material shall not be considered garbage or rubbish and shall not be collected by the solid waste services division. Such material shall not be dumped, placed in alleys, streets, or retained on the premises so as to become a nuisance. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-33. Collection of fees.**

The charges for the removal and disposal of all garbage, trash or rubbish shall be entered by the city in their respective amounts as charges against each such person on the utility bill of such person and the amount so fixed and charged shall be collected monthly in connection with and as a part of the utility bills of the city. Should any person of any place of abode or of any place of business fail or refuse to pay the charges fixed against him and his place of abode or his place of business when due, the city shall be authorized to cut off and disconnect the water and sewer services to his place of abode or place of business and against which such solid waste pickup fees have been fixed and assessed, and in addition thereto shall be authorized to discontinue solid waste pickup services until such fees have been paid in full. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-34. Hauling to transfer station does not avoid charges.**

Should any person, owner, occupant, tenant or lessee within the city haul all or any part of his garbage or rubbish to the transfer station, he shall nevertheless be required to pay garbage and rubbish collection fees in accordance with this article, and shall be required to deposit his garbage and rubbish at the transfer station in accordance with and subject to the rules and regulations of the solid waste services division. (Ord. No. 03-41, § I, 8-26-03)

**Secs. 24-35--24-45. Reserved.**

## DIVISION 2. RESIDENTIAL COLLECTION

**Sec. 24-46. Residential collection services.**

(a) *Utility account:* All residential units that subscribe to water service shall establish a solid waste account with the utility collection division. A mandatory monthly collection fee shall be assessed and shall entitle the residential unit to receive standard weekly collection services. A separate deposit as stated in the rate schedule, division 6, shall be required for solid waste services. A waiver of the deposit maybe given to all active military members. All residential customers who maintain their utility account without incurring a penalty for late payment for a period of twelve (12) months shall receive a refund of their deposit. Such refund shall be credited to the customer's utility account. If the customer incurs more than one (1) late charge during any subsequent twelve (12) month period, a deposit in the amount of the solid waste deposit charge in effect at the time the penalty is incurred will be billed to the customer's account.

(b) *Standard weekly collection service*: Standard weekly collection services that are included in the base monthly rate (fee) shall be:

(1) Once per week collection of garbage/rubbish placed in the city provided roll-out container(s).
(2) Once per week collection of brush, up to six (6) cubic yards.
(3) Once per week collection of yard waste (leaves, grass clippings, shrubs/tree trimmings), placed in bags only.

(c) *Special collection services*:

(1) Special collection services will be provided weekly, for an additional fee, on the scheduled collection service day for the pickup of large items such as furniture; white goods such as appliances; excess garbage/rubbish in bags; excess waste in boxes as defined under section 24-26, definitions; construction and demolition debris such as dismantled fencing material, lumber, floor coverings, plumbing fixtures, and other materials as approved by the solid waste director, or appointed designee.
(2) The additional fees for this special collection service are stated in the rate schedule, division 6, and shall be charged to the monthly utility bill for the residential unit or address that generated the waste.

(Ord. No. 03-41, § I, 8-26-03; Ord. No. 05-12, § I, 2-8-05)

**Sec. 24-47. Title to solid waste placed for collection.**

(a) Title to all solid waste placed at the curb or collection point for collection by the city shall be vested in the city immediately upon placement by the person disposing of such solid waste.

(b) This section does not apply to solid waste that shall not be placed for collection under this chapter and solid waste that the city is prohibited by law or permit condition from collecting,

handling or disposing. The responsibility for properly disposing of such solid waste shall remain with the person placing such waste for disposal.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-48. Prohibited materials.**

The following categories of solid waste are defined as non-collection items and shall not be placed at curbside at any residence or premises for collection by the solid waste services division.

(a) Rock.
(b) Dirt.
(c) Dead animals or dead animal waste.
(d) Tires; tire and wheel combinations (see sections 24-85 and 24-108).
(e) Hazardous waste material.
(f) Lead acid batteries (see section 24-85).
(g) Vehicle bodies, engines, boats, camper shells.
(h) Lawn mowers; riding mowers (see section 24-104).
(i) Liquid waste of any kind.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-49. Automated residential collection system.**

(a) *Container selection (size and quantity)*: Residential units shall be provided roll-out containers of various sizes or volume. The customer may select the size of container(s) that best fulfills their disposal needs for once per week collection. The monthly base rate assessed on the customer utility bill shall be based on size and number of containers requested by the customer.

(b) The container(s) shall be issued to a residential address and shall not be removed from the premises, except by employees of the solid waste services division.

(c) *Containers are city property:* The roll-out containers shall be the property of the city and must not be painted, marked, abused, mutilated, altered, or modified in anyway. Abuse and damage to a container by customers shall result in an assessment equal to the replacement cost of the container and/or time and materials involved to repair such container. Collection service may be discontinued until the assessed fees are paid to the city. Without limiting the foregoing general statement, examples of abuse include, but are not limited to: overloading the container beyond the rated weight capacity of the container; fire damage caused by hot coals and/or ashes; painting or marking the container in any manner; or failing to follow the proper care and use instructions for the container.

(d) *Point of collection:* The container must be placed at the curbside or designated collection point not earlier than 8:00 p.m. prior to the collection day and no later than 7:00 a.m. on the scheduled collection day. The container must be placed at or near the driveway at least four (4) feet from any mailbox or other obstacle. On streets where "no parking" is allowed, the container shall be placed behind the curb. On streets where parking is allowed, the container shall be

placed in the street with wheels against the curb. The solid waste division director may make reasonable exceptions to the foregoing location requirements as needed to meet unique circumstances or to avoid undue hardship caused by literal compliance.

(e) Container(s) shall be removed from the curbside or designated collection point not later than 9:00 p.m. on the scheduled collection day. Container(s) shall be kept or stored on the premises no closer to the street than the front of the residence. Container(s) observed to be on the street at times not allowed shall be removed from the curbside by employees of the solid waste services division, and placed near the front edge of the residence or near the garage area. A tag shall be left on the container handle explaining the infraction and service performed. A fee as stated in the rate schedule, division 6, for this service will be charged to the monthly utility bill.

(f) *Missed service:* Residents whose containers were not collected because they were not placed at the required time or location as required by subsection (d) above are considered a "missed service." Customers with "missed service" may receive collection service for a fee as stated in the rate schedule, division 6, which will be added to the monthly utility bill for that residence.

(g) *Stolen or missing container procedures*: A stolen container shall be reported to the police department and the solid waste services division. If a container is stolen at a time other than that described in subsections (d) and (e) above, the customer shall be assessed a fee to replace the container. If the container is later recovered, the replacement fee will be refunded to the customer.

(h) *Container exchange:* A customer may request a different sized container. A container exchange fee will be charged for an exchange to a larger container. There is no exchange fee for requesting a smaller container. An additional container of any size may be acquired by paying the fee stated in the rate schedule, division 6, for the size of the additional container requested.

(i) *Excess household garbage or rubbish placed in plastic bags:* Excess garbage or rubbish that will not fit into the automated container may be put in plastic bags, not larger than 33 gallons, and placed at the curb at least four feet from the container. After dumping the container provided for the base service, the driver will load the excess bagged garbage into the container for dumping. The driver will reload the container a maximum of twice per collection day. An additional fee for this service will be assessed to the residential unit as stated in the rate schedule, division 6.

(j) *Overloaded container:* An overloaded container is one in which the capacity is exceeded, which is indicated by trash extending above the container rim, so the lid will not close properly. The driver will remove the excess bagged garbage or rubbish level to the top rim of container, dump the container, and reload the excess garbage into the container for dumping. The "overloaded container" fee, as stated in the rate schedule, division 6, shall be charged to the monthly utility bill for that residence.

(k) *Assistance to disabled households:* Disabled households desiring special assistance on collection day must apply for that service by contacting the solid waste services division and

providing the information and verifications required by the solid waste director. At qualifying residential units, the employees of the solid waste services division shall roll the container from its storage location to the curbside for emptying, and return the container to its storage location. The storage location shall be coordinated with the household, but shall be on the premises outside the residence and safely accessible to the employee.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-50. Brush collection.**

(a) Brush collection shall be done once per week on the scheduled collection day for that service area.

(b) Brush, tree limbs, and tree trunks must be cut in lengths not more than twelve feet in length, and the pile shall not be mixed with any other waste, because it is taken to a location to be shredded/chipped into mulch.

(c) Brush must be set within 3 feet of the curb by 7:00 a.m. on the scheduled collection day, and be placed away from fences, shrubs, signs, fire hydrants, gas meters, mailboxes, overhead wires or other obstacles so as not to restrict pickup by a vehicle with a mechanical boom and grapple. Brush shall be placed at least four (4) feet away from the roll-out container so as not to interfere with the automated emptying of the container.

(d) The collection of brush is part of the standard weekly collection service, provided that the brush pile does not exceed six (6) cubic yards or the representative dimensions of 4 ft wide x 4 ft high x 12 ft long. Collection of brush in excess of six (6) cubic yards shall be assessed an excess brush fee as established in the rate schedule, division 6.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-51. Yard waste – grass clippings, leaves, shrubs, and garden trimmings.**

(a) Yard waste shall be placed at curb in bags and shall not weigh more than fifty (50) pounds each. The bags shall have sufficient wall strength and thickness (a minimum of 2.0 mils) to maintain physical integrity when lifted at the top, with the opening closed.

(b) Yard waste, in bags, shall be placed at curb not later than 7:00 a.m. on the scheduled collection day for that service area.

(c) The bags of yard waste shall be placed at least four (4) feet away from the roll-out container so as not to interfere with the automated emptying of the container.

(d) The collection of yard waste in plastic bags is included in the base monthly rate for standard weekly collection service. Additional fees are not assessed.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-52. Move-in cardboard boxes and packing materials.**

(a) A special one-time pickup of move-in cardboard boxes is offered to newcomers to Killeen. The pickup service must be requested by contacting the solid waste services division within six (6) months of establishing an account with the utility collection division. This service shall be provided free of charge on a one time basis to residential customers.

(b) The collection is done on Wednesdays only. The cardboard boxes (ten or more) must be flattened and placed at curb side by 7:00 a.m. Up to six (6) boxes are allowed to be filled with paper wrappings. Boxes that contain garbage or styrofoam are not allowed, these materials shall not be collected and are the responsibility of the resident for proper disposal.

(c) Inclement weather notice: corrugated cardboard boxes and paper have no recycling value if they become wet. Do not place at curbside for collection if inclement weather is eminent or forecast. A fee is charged for the pickup of wet cardboard and paper.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-53. Special free collection of excess Christmas garbage/rubbish.**

On the first scheduled collection day after Christmas day, the excess garbage/rubbish that accumulates during the holidays may be placed in plastic bags, not larger than 33 gallons or boxes not greater in volume than 8 cubic feet, and placed at the curb for pickup. There shall be no charge for this service. This special free service does not apply to other collections such as white goods and large items such as furniture. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-54. Special collection services.**

(a) Fees shall be assessed for collection services not included in the standard weekly collection service. Fees shall be assessed to the residential address that generated the waste materials. The rates are as stated in the rate schedule, division 6.

(b) Special collection services are provided on the same day as the scheduled collection day. Waste materials shall be placed at curbside not later than 7:00 a.m.

(c) Examples of waste material collected for a fee are:

(1) Bulky waste.
(2) Home furnishing or furniture items such as chairs, tables, couches, and mattresses.
(3) White goods or appliances such as washers, dryers, and stoves. See other instructions pertaining to white goods in section 24-55.
(4) Excess household garbage/rubbish placed in plastic bags or boxes. The boxes must have dimensions not greater than 2 ft x 2 ft x 2 ft, and sufficiently sturdy to hold the materials therein when lifted. Waste materials in boxes must be secured so as not to cause litter.
(5) Construction and demolition debris such as carpet, padding, dismantled fences, sinks, commodes, and etc.

(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-55. White goods collection.**

(a) White goods must be separated from other waste to allow pickup by a collection vehicle equipped with a mechanical boom and grapple. The vehicle must have safe clearance for its operation, both lateral and overhead clearance.

(b) Special provisions apply to air conditioning units, freezers, and refrigerators. The refrigerant or chlorinated fluorocarbons (CFC) must be removed by a licensed technician. The appliance must be free of CFC before the item can be picked up. The solid waste services division must be called for instructions. Forms required for certification by a licensed technician can be obtained from the solid waste services division.

(c) White goods must be placed at curb not later than 7:00 a.m. on the scheduled collection day, but not earlier than one day prior to collection day.

(d) A fee is charged for the collection as stated in the rate schedule, division 6, under "collection fees for special collection services."
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-56. Transfer station use.**

Residential customers are authorized one free disposal of not more than 300 pounds per calendar month at the transfer station, when presenting a current utility bill for their residence showing that solid waste services is a paid utility. Weight in excess of 300 pounds shall be assessed at the current scale rate. Items which shall be accepted for disposal are brush, yard waste, grass clippings, leaves, garbage, rubbish, furniture items, building waste, demolition or construction materials or debris such as carpet, padding, roofing shingles, doors, lumber, sinks, commodes, and sheetrock. Walk behind lawnmowers may also be discarded provided it is demonstrated that the mower does not contain fuel or engine oil. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-57. Premium service.**

Premium service includes collection on a day other than the normal scheduled collection day for that residential service area. Premium service is available upon request and charges are as stated in the rate schedule, division 6. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-58. Evictions, move-outs, and households with inactive accounts.**

Nuisance conditions or garbage/trash rubbish at curb for residential evictions, move-outs, and households with an inactive solid waste utility account shall be abated at the direction of the solid waste director. All costs associated with the cleanup shall be billed to the owner of the property, or the responsible party, or the responsible property management office. The fee shall be the greater of: fees as stated in the rate schedule, division 6, or actual costs related to the cleanup, including but not limited to: employee wages, vehicle hourly rates, and the transport

and disposal costs for all solid waste collected. An active utility account, including water, sewer, and solid waste, shall not be allowed until fees are paid for the nuisance abatement. (Ord. No. 03-41, § I, 8-26-03)

**Secs. 24-59--24-60. Reserved.**

DIVISION 3. COMMERCIAL COLLECTION

**Sec. 24-61. Commercial collection services.**

(a) *Utility account*: All commercial businesses shall establish a solid waste account with the utility collections division.

(b) *Service level*: Commercial businesses shall select a level of service sufficiently adequate to prevent a health, sanitation, or litter problem. Service options that are available, but subject to approval by the solid waste director, or appointed designee, are:

(1) Once per week collection using the 96-gallon container.
(2) Once per week collection using the 300-gallon container.
(3) One to six collections per week using a selected size and quantity of dumpster container(s). Available sizes are 2, 3, 4, 6, and 8 cubic yard.

(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-62. Special collection services.**

For additional fees as stated in the rate schedule, division 6, commercial customers may request special collection services for:

(a) The pickup of segregated brush.
(b) The pickup of bulky waste, such as furniture items and appliances.
(c) The cleanup of excess garbage and rubbish on the site.
(d) The removal of large or bulky items placed in containers.

(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-63. Shared containers.**

To the maximum extent possible, container(s) shall be issued to each commercial customer necessary to accommodate their specific disposal needs. However, there are areas in the city that have limited space for container storage, or access is restricted for collection vehicles. In such cases, as approved by the solid waste director, or his appointed designee, a container may be placed in a common area to serve several business activities or commercial customers. Shared container service shall be prorated by the number of customers using the container. The fee for use of the container shall be based on the rate schedule, division 6. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-64. City-furnished containers.**

The city shall furnish all commercial container(s) to be used in the collection and removal of garbage, trash, and rubbish with the exception of compactors. See section 24-66 regarding collection services for privately-owned compactors. (Ord. No. 03-41, § I, 8-26-03; Ord. No. 06-132, § I, 12-12-06)

**Sec. 24-65. Roll-off services.**

(a) Roll-off containers are large, open top containers used primarily on construction sites to store construction and demolition debris. Roll-off containers are available for rental in sizes of 20 and 30 cubic yards.

(b) To obtain the service, an account shall be established with the utility collections division, and a pre-paid deposit shall be made based on size of the container, estimated number of container pickups per month, and the average weight of contents as historically determined by the solid waste director. An additional deposit may be required if the actual expenses incurred over a monthly billing cycle exceed the initial deposit.

(c) The fees for roll-off services are as shown in the rate schedule, division 6, but include the following:

(1) A monthly rental fee for use of the container.
(2) A service fee to pickup, transport, and return container to the site or return to stock.
(3) Weight of container contents.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-66. Compactor services.**

(a) The city provides collection services for compactors owned by the customer. The city does not own, rent, or repair compactors.

(b) Privately owned compactors must be compatible with the city's hauling equipment.

(c) The fees for servicing compactors are as shown in division 6, rate schedule.
(Ord. No. 03-41, § I, 8-26-03; Ord. No. 06-132, § I, 12-12-06)

**Sec. 24-67. Litter, odor, and insect control.**

(a) Sides and doors of all containers shall be kept closed at all times except when the container is being filled or unloaded for disposal.

(b) Putrescible waste shall be placed in disposable containers or plastic bags of sufficient wall strength to maintain physical integrity and capable of being secured from leaking. The disposable container with contents shall be placed unbroken, into the container.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-68. Prohibited items for commercial containers.**

(a) It shall be unlawful to place any item in any container that because of weight, size, or other physical property, could cause damage to the collection vehicle. These items include, but are not limited to, any one (1) item over three (3) feet in any dimension, any one (1) item weighing in excess of fifty (50) pounds, any concrete, masonry products, earthen materials or furniture items such as couches and mattresses.

(b) It shall be unlawful for any person to start a fire, burn any material in a city-owned solid waste container, or to paint or mark the same, or to place any poster, placard, or sign upon the same.

(c) It shall be unlawful for any person, other than the owner or occupant of any premise that is paying for the collection service, to deposit any garbage, trash, or other material in any container.

(d) Other items prohibited for placement in a container are: tires, tire and wheel components, dead animals, dead animal waste, lead acid batteries, paint, lawn mowers, liquid waste of any kind, engines, unbagged or unsealed putrescible waste, and hazardous waste materials of any type.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-69. Container site location and accessibility.**

Commercial businesses using the city's container system for the removal of garbage, trash, and rubbish shall provide a readily accessible site for placement of container(s) on the establishment's property. Locating containers in streets, right-of-ways, the traveled portion of alleys, and intersection sight triangles is strictly prohibited. The site must have overhead clearance to allow pickup and emptying of containers by the city's collection vehicles. The site location shall be subject to approval of the solid waste director, or appointed designee. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-70. Site maintenance.**

Maintenance of the site, together with the approach, shall be the responsibility of the owner. The city shall not be responsible for damage caused by collection vehicles to driveways, parking lots, or other traveled surfaces. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-71. Compactor maintenance.**

(a) The city maintains and repairs city-owned containers on a cycle and as needed basis, such as washing, painting, replacement of lids and doors, and welding repairs to the container body.

(b) Customers shall not paint, mark, abuse, damage, alter, or modify the container in any way. Only those decals authorized by the solid waste director, or his appointed designee, may be

affixed to containers and the installation shall only be done by city employees.

(c) Containers, or parts thereof, that are damaged through other than fair wear and tear shall be charged to the customer. For example, any container that is destroyed or damaged by hot ashes or coals shall be the responsibility of the customer and shall be repaired or replaced at the customer's expense.

(d) Maintenance and/or repair of privately owned compactors is the responsibility of the commercial customer or owner.
(Ord. No. 03-41, § I, 8-26-03; Ord. No. 06-132, § I, 12-12-06)

**Sec. 24-72. Site clean up.**

It is the responsibility of the customer to keep the area around the point of collection clean and sanitary. If conditions are a nuisance, thereby causing a litter, odor, environmental, unsanitary, or potential health hazard, the condition shall be abated as directed by the solid waste director. The customer shall pay all costs related to the cleanup, including but not limited to employee hourly wages, collection vehicle hourly rates, and the transport, and disposal costs for all solid waste collected. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-73. Container locking devices.**

Locking devices are available to secure the container lid to prevent unauthorized access. The locking device allows the container to be secured at times needed, and does not have to be unlocked for the city to service the container. Fees are as stated in the rate schedule, division 6, and include a one time installation fee of the locking device and a monthly fee. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-74. Container pads for commercial containers.**

As of the effective date of this article, all new container service requests must first comply with the following standards for container pads and screening prior to collection by the city.

(a) Concrete pad and approach apron shall be constructed from concrete and shall be deemed to support the collection equipment.
(b) The minimum dimensions of the approach apron shall be fourteen (14) feet wide and a depth of six (6) feet.
(c) The minimum dimensions of the concrete pad, where a single container sits, shall be fourteen (14) feet wide and a depth varying from six (6) feet to fourteen (14) feet, depending on size of container. All containers have a width of eighty (80) inches.
(d) All pads shall have screening on at least three (3) sides. Screens shall be constructed of masonry block, wood, or chain link fencing with slats. Doors are optional, but if installed, shall have features to secure doors in an open position while the collection vehicle is emptying the container.
(e) The orientation of the pad shall accommodate a safe approach by the collection vehicle. The pad shall be level with the roadway or slope to roadway for easy access.

(Ord. No. 03-41, § I, 8-26-03)

**Secs. 24-75--24-80. Reserved.**

DIVISION 4. RECYCLING PROGRAM

**Sec. 24-81. Definitions.**

The following words, terms, and phrases, when used in this article, shall have the following meaning ascribed to them.

(a) *Recycle materials* means materials such as, but not limited to, paper products, glass, aluminum and other metals, plastic, and containers made in whole or in part of aluminum, metal, or plastic, which are separated and segregated from other garbage, trash, or refuse for the purpose of recycling and which are placed in a recycling receptacle for use in a recycling program.

(b) *Recycling* means the process of collecting and turning used products into new products by reprocessing or remanufacturing them.

(c) *Recycling program* means the organized collection of recyclable material for the purpose of resource recovery and recycling in pursuit of the goals of the city.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-82. Ownership of recyclable material.**

Placing recyclable material in an authorized recycling receptacle at a designated recycling location shall be deemed to vest title to the material to the city and shall not constitute abandonment of the material. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-83. Value.**

It is hereby declared that recyclable material has value. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-84. Theft of recyclable material prohibited.**

Any person, other than an authorized city employee, who collects, obtains, possesses, picks up, takes, or otherwise removes any recyclable material from an authorized recycling receptacle or removes an authorized recycling receptacle that has been placed at a designated recycling location or both, commits the offense of "theft" as defined in the Texas Penal Code. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-85. Recycling drop-off center.**

(a) The city operates two (2) citizen drop-off sites for recyclable materials. One is the Killeen recycle center located at 111 East Avenue F and the other at the transfer station, 90648

South Hwy. 195.

(b) Acceptable materials vary by drop-off site, but are as posted at the site. Generally, acceptable materials include: paper products, metals, plastic containers #1 and #2, glass jars and bottles, and automotive materials such as waste oil, oil filters, transmission oil, hydraulic oil, differential oil, and lead acid batteries. Fees are not charged for depositing these materials.

(c) Scrap tires are accepted at the drop-off center, but a fee is charged per tire as stated in the rate schedule, division 6.

(d) Materials brought to the drop-off sites shall be placed in the designated container, or as directed by a site attendant. Materials shall not be left at drop-off sites during non-operational or non-public access hours.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-86. Public scale.**

The Killeen recycling center operates a certified public scale which can accommodate most vehicles, except large tractor trailers. A fee is charged for the use of scales as stated in the rate schedule, division 6. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-87. Residential curbside recycling service.**

(a) Residents may subscribe to a curbside recycling service for the collection of designated recyclables. The service frequency is once per week, same day as the scheduled collection day, using a 22-gallon recycling "blue" bin.

(b) The monthly subscription fee is stated in the rate schedule, division 6.

(c) A subscriber to the service may request an additional (second bin) and lid(s) for the bin(s) for a one-time fee as stated in the rate schedule, division 6.

(d) The recycling bin shall be placed at curb approximately four (4) feet away from the city furnished roll-out container no later than 7:00 a.m. on the scheduled collection day.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-88. Move-in cardboard boxes and packing materials.**

(a) A special one-time pickup of move-in cardboard boxes is offered to newcomers to Killeen. The pickup service must be requested by contacting the solid waste services division within six (6) months of establishing an account with the utility collection division. This service shall be provided free of charge on a one time basis to residential customers.

(b) The collection is done on Wednesdays only. The cardboard boxes (ten or more) must be flattened and placed at curb side by 7:00 a.m. Up to six (6) boxes are allowed to be filled with paper wrappings. Boxes that contain garbage or Styrofoam are not allowed; these materials shall

not be collected and are the responsibility of the resident for proper disposal.

(c) Inclement weather notice: corrugated cardboard boxes and paper have no recycling value if they become wet. Do not place at curbside for collection if inclement weather is eminent or forecast. A fee is charged for the pickup of wet cardboard and paper.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-89. Freon or chlorinated fluorocarbon (cfc) evacuation service.**

(a) Appliances, such as refrigerators, that contain Freon or CFC's, are accepted if delivered to the Killeen recycling center. A fee is charged for the evacuation of CFC's by a licensed technician and the disposal of the appliance; the fee is stated in the rate schedule, division 6.

(b) For residences without transportation means, the pickup of an appliance that contains CFC's may be arranged with the Killeen recycling center for a curbside collection. A fee is charged for the collection, the CFC evacuation service, and the disposal of the appliance, as stated in the rate schedule, division 6.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-90. Roll-off service for special recycling purposes or events.**

(a) The solid waste services division may offer roll-off containers for occasional use for the restricted collection of recyclable materials. The use of a roll-off shall be coordinated with the recycling manager.

(b) It is the responsibility of the roll-off customer to insure only designated recyclables are placed in the roll-off container. Roll-offs with garbage/rubbish will be charged standard rates.

(c) A roll-off rental fee as stated in the rate schedule, division 6, shall be paid at the time the roll-off service is coordinated with the recycling manager.

(d) Recyclable material placed in the roll-off becomes the property of the city.
(Ord. No. 03-41, § I, 8-26-03)

**Secs. 24-91--24-99. Reserved.**

DIVISION 5. TRANSFER STATION

**Sec. 24-100. Authorized users of the transfer station facility.**

The transfer station facility is the central receiving and transfer point for all municipal solid waste generated by the city. Persons authorized to dispose of waste at the facility are:

(a) Killeen residents and commercial businesses.
(b) Citizens and businesses in the rural areas (counties).
(c) Citizens from other municipalities.

(d) Out-of-town contractors or businesses who have a work permit in Killeen.
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-101. Hours of operation.**

The hours of operation for the public are 8:00 a.m. – 5:00 p.m. on Monday, Tuesday, Thursday, Friday; and 8:00 a.m. – 3:00 p.m. on Wednesday and Saturday. The facility is closed to the public on Sunday and the holidays: Thanksgiving Day, Christmas Day, and New Year's Day. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-102. Permit restrictions.**

(a) The transfer station must operate in compliance with the Texas Commission on Environmental Quality (TCEQ) rules and regulations, and the approved site operating plan. The facility is not permitted to accept hazardous waste or special waste. Special waste is any solid waste that because of quantity, concentration, physical or chemical characteristics or biological properties, requires special handling and disposal to protect human health or the environment.

(b) Special waste **NOT ACCEPTED:**

- Septic tank pumpings.
- Medical waste from health care facilities.
- Grease and grit trap waste.
- Discarded materials containing asbestos.
- Segregated hazardous waste from small quantity generators.
- Slaughter house waste and dead animals.
- Other waste classified as special waste by the Texas Commission on Environmental Quality (TCEQ) Rules and Regulations.

(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-103. Military material prohibited.**

Garbage, rubbish, or other solid waste generated on the Fort Hood military reservation shall not be accepted at the transfer station without prior approval from the city manager. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-104. Transfer station use and charges for Killeen residents.**

Residential customers are authorized one free disposal of not more than 300 pounds per calendar month at the transfer station, when presenting a current utility bill for their residence showing that solid waste services is a paid utility. Weight in excess of 300 pounds shall be assessed at the current scale rate. Items which shall be accepted for disposal are brush, yard waste, grass clippings, leaves, garbage, rubbish, furniture items, building waste, demolition or construction materials or debris such as carpet, padding, roofing shingles, doors, lumber, sinks, commodes, and sheetrock. Walk behind lawnmowers may also be discarded provided it is demonstrated that the mower does not contain fuel or engine oil. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-105. Charges for non-residents, commercial businesses and all others.**

Disposal of acceptable waste materials at the transfer station shall be calculated by weight as determined by the on-site scales. The fees are as stated in the rate schedule, division 6. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-106. Surcharge for unsecured loads.**

Vehicles hauling waste to the site must be enclosed or provided with a tarpaulin, net, or other means to secure the load to prevent blowing litter or spillage. A surcharge shall be assessed for unsecured loads as stated in the rate schedule, division 6. (Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-107. Recycling drop off-site.**

(a) A citizen's drop-off site for recyclable materials is located at the transfer station. Recycle materials that are accepted are posted at the site. Fees are not charged for depositing these materials.

(b) White goods are accepted at the facility without payment of fees. However, any appliance such as freezer, air conditioning unit, or refrigerator must have a certification from a licensed technician that the appliance is free of refrigerant or chlorinated fluorocarbon (CFC).
(Ord. No. 03-41, § I, 8-26-03)

**Sec. 24-108. Scrap tires.**

(a) The facility accepts most tires from cars and pick-up trucks for disposal. A fee is charged for each tire based on size, as stated in the rate schedule, division 6.

(b) Tires that have a bead of two (2) inches or greater shall not be accepted for disposal. The bead is the thickness of the tire that fits against the wheel rim. Most tires from off-road construction equipment are in the unacceptable category.
(Ord. No. 03-41, § I, 8-26-03)

**Secs. 24-109--24-114. Reserved.**

DIVISION 6. RATE SCHEDULE

**Sec. 24-115. Residential rates.**

(a) Variable rates shall be charged depending on the size and quantity of containers selected. This monthly base rate includes the standard weekly services as stated in section 24-46(b). Sales tax shall be added to fees for goods and services where required by state law. A separate deposit of $30.00 shall be required for solid waste services when establishing a water services account with the utility collections division.

| Container Size(s) Available | Monthly Base Rate |
|---|---|
| 96 gallon | $17.50 |
| 64 gallon | $15.60 |
| 32 gallon | $14.38 |

(b) Additional container(s) of the same or different size may be subscribed by paying the fee stated above for the additional container(s).

(c) A container exchange fee of $10.00 shall be charged for all exchanges to a larger container or additional containers. This is a one-time fee charged to the monthly utility bill. There shall be no charge for customers who exchange a larger container for a smaller container.

(d) Brush collection: on the scheduled collection day, residents are allowed up to six (6) cubic yards of segregated brush (dimensions of 4 ft x 4 ft x 12 ft). Brush in excess of this amount shall be charged a fee at the rate of seven dollars ($7.00) per cubic yard.

(e) Special collection service fee: solid waste (excluding non-collectibles) that are identified under section 24.54 and at curb on the scheduled collection day and properly prepared for collection shall be picked up for the following fees:

(1) $20.00 minimum for a volume up to three (3) cubic yards.
(2) $7.00 per cubic yard in excess of three (3) cubic yards.

(f) Replacement cost for lost, stolen, or damaged roll-out containers or recycling bins through customer abuse or neglect: $19.00 service fee, plus the cost to purchase the replacement container.

(g) Replacement of container lids, wheels, and other container hardware due to customer abuse or neglect: $19.00 Service fee, plus the cost of replacement part(s).

(h) Missed service fee for automated collection: $7.00 for return trip.

(i) Automated container reload for excess garbage placed in plastic bag: $6.00 per reload; maximum number of reloads per collection two (2), for a maximum fee of $12.00.

(j) Fee charged for an overloaded container: $6.00.

(k) Residential premium service.

(1) $22.00 for emptying of automated container only.
(2) $22.00 service fee and $7.00 per cubic yard for other special waste properly prepared for collection.

(l) Fee to remove roll-out residential container from curb by city employee: $6.00.

(Ord. No. 03-41, § I, 8-26-03; Ord. No. 09-057, § I, 9-15-09; Ord. No. 10-048, § I, 9-24-10; Ord. No. 11-081, § I, 9-13-11)

**Sec. 24-116. Commercial rates.**

(a) Once per week collection using a 96-gallon container: $17.50 per month.

(b) Once per week collection using a 300-gallon container: $52.97 per month.

(c) Dumpster container rates are based on size of container and frequency of weekly collection.

(1) Monthly fees:

| Dumpster Size | Collections Per Week | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2 cu yd | $ 73.02 | $111.37 | $155.76 | $200.15 | $245.48 | $288.92 | $333.31 |
| 3 cu yd | $ 89.12 | $138.24 | $194.70 | $251.18 | $307.65 | $364.12 | $420.59 |
| 4 cu yd | $104.24 | $164.19 | $232.74 | $301.27 | $369.85 | $438.41 | $506.96 |
| 6 cu yd | $136.47 | $217.92 | $310.64 | $403.35 | $496.07 | $588.78 | $681.49 |
| 8 cu yd | $168.69 | $271.51 | $388.51 | $505.40 | $622.27 | $739.17 | $856.05 |

(2) Fees for extra pickups:

| Size of Container | For Customer Reload on Site | For Call-In Service |
|---|---|---|
| 2 cu yd | $11.38 | $25.65 |
| 3 cu yd | $14.51 | $28.76 |
| 4 cu yd | $17.60 | $31.86 |
| 6 cu yd | $23.82 | $38.07 |
| 8 cu yd | $30.02 | $44.28 |

(d) Fees for collection from privately owned, small compactors are based on size of compactor and frequency of weekly collection:

| Compactor Size | Collections Per Week | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4 cu yd | $138.25 | $271.42 | $404.59 | $537.73 | $ 670.93 | $ 804.10 | $ 937.27 |
| 6 cu yd | $185.48 | $366.56 | $545.65 | $725.74 | $ 905.82 | $1085.90 | $1265.97 |
| 8 cu yd | $232.76 | $459.68 | $686.84 | $913.91 | $1140.95 | $1368.00 | $1595.04 |

(e) Fees for roll-off container service:

(1)

| Size of Container | Rental Fee (a) | Service |
|---|---|---|
| 20 yd open top | $123.89 | $126.81 +weight[b] |
| 30 yd open top | $146.34 | $126.81 +weight[b] |
| 40 yd open top | $167.81 | $126.81 +weight[b] |
| 20 yd compactor | Must own | $126.81 +weight[b] |
| 30 yd compactor | Must own | $126.81 +weight[b] |
| 42 yd compactor | Must own | $126.81 +weight[b] |
| (a) minimum fee: one month rental for first month; prorated for subsequent months | | |
| [b] weight fee is $ 58.70 per ton | | |

(2) Prepaid deposit based on number of services per month:

| Size of Roll Off | Number of Services Per Month | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 20 yd open top | $399.00 | $695.40 | $ 991.80 | $1288.20 | $1584.60 | $1881.00 | $2177.40 | $2473.80 |
| 30 yd open top | $484.50 | $839.04 | $1194.72 | $1550.40 | $1906.08 | $2261.76 | $2575.26 | $2929.80 |
| 40 yd open top | $558.60 | $974.70 | $1390.80 | $1803.48 | $2217.30 | 2631.13 | $3047.22 | $3463.32 |

(f) Installation of locking bar device on commercial containers: $31.38 installation fee plus $3.14 monthly rental.

(g) Dumpster cleaning required by solid waste director or requested by customer, because of odor or unsanitary condition: $65.00 per wash.

(h) Necessary dumpster cleaning and painting after a fire in container: $230.00.

(i) Mechanical assistance to customer to unload unauthorized items in container, such as appliances, couches, etc: $50.50.

(j) *Manual collection*: one hundred thirty eight dollars and thirty seven cents ($138.37) per hour based on the total amount of time including; but not limited to, travel, loading and disposal, plus weight of contents.

(k) *Special mechanical collection*:

(1) $20.00 minimum for a volume up to three (3) cubic yards.
(2) $7.00 per cubic yard in excess of (3) three cubic yards.

(l) Waiting time (blocked dumpster asked to wait) - $128.27/hour; $2.15/minute.

(m) After hours special pickup of dumpsters (under two hours) - $50.50.

(n) Deposit at utility collections division for recurring use of transfer station in order to be able to charge disposal costs - $125.00.

(o) Installation of dumpster - $50.50.

(p) Relocation of dumpster -$50.50.
(Ord. No. 03-41, § I, 8-26-03; Ord. No. 04-70, § I, 8-24-04; Ord. No. 05-72, § I, 9-13-05; Ord. No. 06-132, § I, 12-12-06; Ord. No. 09-057, § I, 9-15-09; Ord. No. 10-048, § I, 9-14-10; Ord. No. 11-081, § I, 9-13-11)

**Sec. 24-117. Recycling rates.**

(a) Subscription to the residential curbside recycling service: $2.48 per month.

(b) Additional (or second) 22-gallon recycling bin: city's current cost to purchase containers – one time cost only.

(c) Lid cover for the 22-gallon recycling bin: city's current cost to purchase lids – one time cost only.

(d) Public scale fee:

(1) Weight ticket - $9.00
(2) Copy of ticket - $6.00

(e) Roll-off rental for special purposes or events: $65.00 (per service).

(f) Fee for each appliance received at Killeen recycling center for CFC evacuation and disposal of appliance: $20.00.

(g) Pickup of an appliance containing CFC's at residential curbside, CFC evacuation, and disposal of appliance: $40.00.
(Ord. No. 03-41, § I, 8-26-03; Ord. No. 09-057, § I, 9-15-09; Ord. No. 10-048, § I, 9-14-10; Ord. No. 11-081, § I, 9-13-11)

**Sec. 24-118. Transfer station rates.**

(a) Disposal fee, when applicable, shall be calculated by weight as determined by the on-site scales, at a rate of fifty-eight dollars and seventy cents ($58.70) per ton, two dollars and ninety-three cents ($2.93) per one hundred (100) pounds; which is the minimum fee.

(b) Surcharge for unsecured load: $25.00.

(c) Tire disposal fees:

(1) Passenger/light truck tires greater than 12" rim size up to a 22" rim size: $3.00.
(2) Passenger/light truck tires up to a 12" rim size: $2.50.
(2) Commercial tires, but not larger than a 2" bead: $6.00.

(Ord. No. 03-41, § I, 8-26-03; Ord. No. 09-057, § I, 9-15-09; Ord. No. 10-048, § I, 9-14-10; Ord. No. 11-081, § I, 9-13-11)

**Secs. 24-119--24-125. Reserved.**